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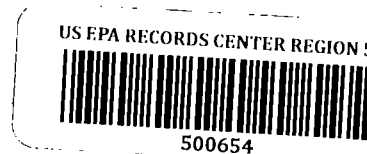
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April 2, 2003

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Nike C-54
SF/tech

Environmental Engineering Branch
DERP Section



Mr. Brian Conrath
Illinois Environmental Protection Agency
Bureau of Land
1021 North Grand Avenue East
Springfield, IL 62794-9276

Dear Mr. Conrath:

Enclosed is the Final Preliminary Assessment Report conducted at the former Nike Battery C-54 in Orland Park, Illinois. Once we receive a notice of final acceptance the reference packages will be shipped and copies will be sent to the property owners.

Feel free to contact me if you have any questions. I can be reached by phone at (502) 315-6344 or by e-mail at katherine.l.johnson@usace.army.mil.

Sincerely,

Kate Johnson
Kate Johnson

Project Scientist

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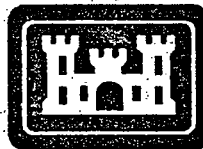
**FORMER NIKE SITE C-54
ORLAND PARK, COOK COUNTY, ILLINOIS**

PRELIMINARY ASSESSMENT

*Final
Revision 0*

March 2003

PREPARED FOR



U.S. ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT

Contract No. DACA27-98-D-0031

Delivery Order No. 0006

Prepared by
Plexus Scientific Corporation
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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Plexus Corporation has completed the Final Report for the Preliminary Assessment to be conducted at former Nike Missile Site C-54 located in Orland Park, Illinois. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy.



Project Manager, Barbara Seymour

3-31-03

Date



Bill Millar, Technical Reviewer

3-28-03

Date

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LIST OF ACRONYMS

ABAR	alternate battery acquisition radar
ASCS	Agricultural Stabilization and Conservation Service
ASTM	American Society for Testing and Materials
AST	above ground storage tank
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
DoD	Department of Defense
DPW	Department of Public Works
ESDA	Emergency Service and Disaster Assistance
GSA	General Services Administration
HHB	Headquarters and Headquarters Battery
HRS	Hazard Ranking System
IRFNA	inhibited red fuming nitric acid
LCT	launch control trailer
LOPAR	low power acquisition radar
LUST	leaking underground storage tank
MCL	maximum contaminant level
MSL	mean sea level
MTR	missile tracking radar
PA	Preliminary Assessment
PCB	polychlorinated biphenyl
RCRIS	Resource Conservation and Recovery Information System
SALT	Strategic Arms Limitation Talks
SARA	Superfund Amendments and Reauthorization Act
SI	Site investigation
STP	sewage treatment plant
TPH	total petroleum hydrocarbons
TTR	target tracking radar
UDMH	unsymmetrical dimethyl hydrazine
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank
VOCs	volatile organic compounds

1. INTRODUCTION

Plexus Scientific Corporation (Plexus) has been contracted by the U.S. Army Corps of Engineers (USACE), Louisville District (Contract Number DACA27-98-D-0031, Delivery Order 0006), to conduct a Preliminary Assessment (PA) at former Nike Site C-54 (C-54), Orland Park, Cook County, Illinois (Figure 1-1). This PA is conducted under the authority of Executive Order 12580 and Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). The PA was conducted in accordance with the U.S. Environmental Protection Agency (USEPA) *Guidance for Performing Preliminary Assessments Under CERCLA* (USEPA, 1991). Nike site C-54 was not identified during a search of the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) database.

The purpose of this investigation was to collect sufficient information concerning conditions at the former Nike site to assess the threat posed to human health and the environment and determine the potential for a site investigation (SI). The Hazardous Ranking System (HRS) scoring process will not be completed as a part of the PA. This PA includes review of available file information, collection and review of historic aerial photographs, interviews and a site reconnaissance (July 2, 2001). This PA includes only an assessment of possible environmental concerns associated with the former Nike site activities.

The Nike site consists of two geographically separated areas: the Control Area and the Launch Area. The Control Area is located at 10500 West 153rd Street, Orland Park, Cook County, Illinois, approximately three miles north of Orland Park, Illinois. The former Nike Site C-54 Launch Area is located at 15655 Ravinia Avenue, Orland Park, Cook County, Illinois.

Records were obtained from the Village of Orland Park, the Orland Park Fire Department, and Andrew Corporation. Historic aerial photographs were obtained from the U.S. Geological Survey (USGS), the Agricultural Stabilization and Conservation Service (ASCS), Chicago Aerial Photo Services, Inc. (CAPS), and Sidwell Company.

Contact was made with the Corps of Engineers, Office of History; the Fort Bliss Historian; the Air Defense Artillery Museum; and the Illinois National Guard in an attempt to obtain site-specific information. The Office of the History of the Corps of Engineers stated that the Corps of Engineers or the National Archives and Records Administration (NARA) did not preserve records of individual Nike sites. Fort Bliss and the Air Defense Artillery Museum maintain no records of Nike sites. The holdings of the Library of Congress Historic Architectural Engineering Record were reviewed and no drawings relating to this site were found. A list of persons and offices contacted for information is included in Appendix A.

2. SITE DESCRIPTION, HISTORY, AND WASTE CHARACTERISTICS

2.1 Location

The former Nike Site C-54 consists of two parcels of land – the Control Area and the Launch Area. The Control Area is located at 10500 West 153rd Street, Orland Park, Cook County, Illinois, approximately three miles north of Orland Park, Illinois. The Control Area is on the property of Andrew Corporation, communications equipment manufacturer. The geographic coordinates of the Control Area are 41° 36' 37" north latitude and 87° 52' 28" west longitude (USGS, 1993). To reach the Control Area turn west onto West 153rd Street from La Grange Road. The former Control Area is approximately 1 mile on the south side of the road after passing over the railroad tracks (Figure 1-1).

The former Nike Site C-54 Launch Area is located at 15655 Ravinia Avenue, Orland Park, Cook County, Illinois. The Launch Area is on the property of the Village of Orland Park Public Works Department and U.S. Army Reserve, Shop Number 45. The geographic coordinates of the Launch Area are 41° 36' 19" north latitude and 87° 51' 18" west longitude (USGS, 1993). To reach the Launch Area turn west onto West 153rd Street, then turn south onto Ravinia Avenue for four-tenths of a mile. The former Launch Area is located on the east side of Ravinia Avenue (Figure 1-1).

2.2 Site Description and History

The Control Area is located on the property of Andrew Corporation. The U.S. leased 36.91 acres for the Control Area from Andrew Corporation. The Control Area consisted of the various tracking and acquisition radars; a barracks; a mess hall; a motor pool building; guard shacks; an administration building; water pumping, treatment and storage facility; and a sewage treatment facility (Figure 2-1). Three of the former Control Area buildings remain (a barracks, barracks/mess hall and the motor pool). According to an Andrew Corporation site representative, Andrew Corporation capped the floor drain located in the motor pool in the early 1990s. The sewage treatment plant is no longer in use. Five underground storage tanks (USTs) were removed from the Control Area in 1985. Andrew Corporation currently uses the site for tractor-trailer parking and storage (Plexus, 2001). Figure 2-2 presents an overlay of the Control Area features on a 1999 orthophoto quadrangle.

The former Control Area is bordered by the Andrew Corporation facilities to the north; Centennial Park to the east; agricultural land to the south; and a residential area to the west (USGS, 1993; Plexus, 2001). The nearest residence is approximately 400 feet to the northeast of the site. The site elevation varies from 740 feet above mean sea level (MSL) in the south central portion of the site to 700 feet above MSL on the eastern perimeter of the site (USGS, 1993).

The Launch Area is located on the property of the Village of Orland Park Public Works Department and the U.S. Army Reserve Area Organization Maintenance Shop No. 45. Current property boundaries of the Launch Area are displayed in Figure 2-5. Buildings at the Launch Area included a support building; missile maintenance building; generator building; water treatment, storage and pump building; and three underground storage magazines (Figure 2-3).

Two underground storage magazines were constructed for the Ajax missile only. The third magazine was converted for the Hercules missile. This conversion allowed for the increased weight of the Hercules missile and launchers (Morgan and Berhow, 1996). However, historical references indicate that only Ajax missiles were stored onsite. The Village of Orland Park's Emergency Service and Disaster Assistance (ESDA) used one of the underground magazines from 1971 until the mid-1980s for a communications center and shelter for 700 to 1000 people (Orland Heritage, 1991). Due to difficulties with maintaining the facility, ESDA discontinued use, equipment was stripped from the facility, and the magazine was filled (Plexus, 2001). The magazines were filled with structural debris, gravel and concrete and then covered with asphalt (Casey, 2003). The administration building and garages of the Village of Orland Park Department of Public Works were built on top of the structures. The area around the administration buildings and garages is paved. The bermed area of the former acid refueling station is used as a firing range by the police department. The Army Reserve facility is used for vehicle maintenance. Four of the former Nike site buildings remain onsite. These buildings include the Generator Building, the Missile Assembly and Test Building, the Ready Building and the Pump House. In addition, the concrete pad for the Control Van and the water cistern remain onsite. The Army Reserve has added additional structures to the site. Three USTs have been removed from the Army Reserve portion of the site, but no records of this removal were located. The former sewage treatment plant at the Launch Area is now a gravel parking lot. According to a site representative, the onsite well associated with the Nike site is used for nonpotable water needs (Plexus, 2001). Figure 2-4 presents an overlay of the Launch Area features on a 1999 orthophoto quadrangle.

The former Launch Area is bordered by a swampy area to the north; a residential district to the west; and a retail area to the south and east (USGS, 1993; Plexus, 2001). The site elevation is approximately 695 feet MSL (USGS, 1993).

The United States acquired 17.45 fee acres for the Launch Area, 36.91 lease acres for the Control and Housing Area, 0.46 license acres for sewer lines, and 186.65 acres of easement between 1955 and 1958 for the establishment and operation of Nike Battery C-54 by the U.S. Department of the Army, 5th Region RADCOM (USACE, 1991). The units assigned to the site were as follows:

- Headquarters and Headquarters Battery, 13th Missile Battalion (1956 to September 1958);
- Battery B, 13th Missile Battalion (1956 to September 1958);
- Headquarters, 22nd Artillery Group (December 1961);
- Headquarters and Headquarters Battery, 2nd Missile Battalion, 60th Artillery Regiment (September 1958 to December 1961); and
- Battery B, 2nd Missile Battalion, 60th Artillery Regiment (September 1958 to December 1961) (Morgan and Berhow, 1996).

Nike Site C-54 operated from 1955 to December 1961 (Lonnquest and Winkler, 1996). After the site was reported excess to the General Services Administration (GSA) in December 1964, the lease agreement was terminated and 8.31 acres were sold by Quitclaim Deed to the Village of Orland Park on 26 April 1971. The Department of the Army retained 9.14 fee acres for Army Reserve functions (USACE, 1991). Figure 2-5 displays current ownership of the Launch Area.

2.3 Background of Nike Missile Installations

Nike missiles provided the last line of defense for the U.S. population and its industrial centers against advancing technology in air warfare. The U.S. Army built the first Nike missile batteries in 1953. This effort produced three generations of Nike missiles: Nike Ajax, Nike Hercules, and Nike Zeus (Carlson et al., 1996). Former Nike Site C-54 housed only the Nike Ajax missiles (Morgan and Berhow, 1996; Lonnquest and Winkler, 1996).

Nike Ajax missiles used a two-stage propulsion system. The first stage was a solid-fuel booster, which would separate and fall away after the first 2.5 seconds of ignition. The second stage of propulsion consisted of a liquid-fuel sustainer motor. The Ajax weighed over 2,455 pounds, had a speed of Mach 2.3, and a range of 30 miles (Carlson et al., 1996).

The booster motor was a cast double-base propellant monolith. The propellant contained nitroglycerine and nitrocellulose with burn modifiers and stabilizers distributed in a plastic matrix (Davie, 2000). A typical recipe for double base rocket propellant is

- 51.38 % Nitrocellulose (propellant) - too rigid but reasonably stable
- 43.38 % Nitroglycerin (propellant) - too sensitive, (explosive) and too liquid to be used by itself
- 03.09 % Diethyl phthalate (plasticizer) - improves the propellant's structural properties
- 01.45 % Potassium nitrate (flash depressor) - promotes smooth burning at low temperatures
- 00.60 % Nigrosine dye (opacifier) - prevents heat transfer by radiation to sections of the propellant that have not started to burn
- 00.10 % Diphenylamine (stabilizer) - absorbs the products of slow decomposition (Muolo, 1993).

The liquid-fuel sustainer motor used 99 % unsymmetrical dimethylhydrazine (UDMH) or aniline/furfuryl alcohol as the starting mixture. The fuel was a mixture of 83% JP-4 and 17% UDMH with inhibited red fuming nitric acid (IRFNA); composed of 83% Nitric Acid, 14% Nitrogen Dioxide, 0.6% Hydrofluoric Acid, acting as an oxidizer. The liquids for the sustainer motor were shipped to the site in drums with the missile (Army, 1958; Carlson et al., 1996). Each Nike Ajax carried three high explosive warheads mounted in the nose, center and aft sections of the missile. The warheads weighed 12, 179, and 122 pounds, respectively (Carlson et al., 1996).

Each Nike Ajax carried three high explosive warheads mounted in the nose, center, and aft sections of the missile (Carlson et al., 1996). The M2 warhead was located in the nose section of the missile body. The warhead consisted of a cylindrical steel body and dome-shaped head covered by two layers of preformed fragments. The body contained a bursting charge of approximately 4.5 pounds of Composition B and a small tetryl booster. The M2 warhead weighed approximately 12 pounds. The M3 and M4 warheads were located in the center and aft sections of the missile body, respectively. The warheads consisted of ellipsoidal bodies over which was inlayed a single layer of preformed fragments in a plastic matrix. An aluminum cover

retained the fragments. Each warhead had a bursting charge of Composition B. Both warheads had integral metal lifting eyes at each end. Removable initiators were installed in each warhead. The initiators were in contact with tetryl boosters embedded near the center of the bursting charge. The M3 warhead contained approximately 92 pounds of explosive filler and weighed 177 pounds. The M4 warhead contained approximately 59 pounds of explosive filler and weighed 121 pounds (Army, 1958).

The Nike system was created in response to the former Soviet Union's efforts to design and deploy long-range bombers. The shifting nature of the Soviet threat meant that the air defense role, for which the Nike system was originally intended, became relatively less critical as time passed. Accordingly, beginning in the mid-1960s, the total number of operational Nike bases within the continental United States was steadily reduced on an almost annual basis (Bender, 1999).

The 1972 signing of the Strategic Arms Limitation Talks (SALT I) treaty limited the number of missiles with anti-ballistic missile capabilities, including the Nike Hercules. In 1974, the remaining U.S. sites in the Nike air defense system were inactivated. Shortly thereafter, the Army Air Defense Command, which administered the system, was dissolved (Bender, 1999).

2.3.1 General Nike Site Layout

The buildings and structures on a typical Nike base were organized into two geographically separate areas: the Integrated Fire Control Area (Control Area) and the Launch Area. Approximately 4,700-feet separated the Control and Launch Areas of C-54. Technical limitations of the guidance system required the two facilities to be separated by at least 3,000 feet. Control Areas were typically constructed on high ground to improve radar coverage of the area (Bender, 1999; Carlson et al., 1996).

The Control Area contained the ground-based radar and computer systems. The systems were designed to detect and track incoming enemy aircraft and to guide the missiles to their target (Bender, 1999; Carlson et al., 1996). The C-54 Control Area also contained housing, administration buildings, mess halls, barracks, and recreational facilities (Carlson et al., 1996, Plexus 2001).

The Launch Area contained a Launch Control Trailer, a Missile Assembly and Test Building, Underground Storage Magazines and Launcher-Loader Assemblies, and a Generator Building (Carlson et al., 1996). The missiles were stored horizontally in heavily fortified underground magazines. An elevator brought the missiles to the surface where site personnel would manually push the missiles along rails to the launchers. The missiles were then attached to the launchers, which were erected to a near-vertical position for firing. The near-vertical firing position was used to ensure that the missile's booster would not land on the missile site when spent, but instead would land within a predetermined "impact area" (Bender, 1999).

Nike missile sites across the nation utilized standardized buildings and structures. These buildings served the same purpose from site to site; therefore a characterization of the waste produced and a correlation to nearby buildings is possible. Although there were some variations in structure, most buildings were one-story structures with cinder-block walls and slanted metal roofs. Also, Nike missile facilities were designed to be mobile, thus many of the buildings designed to control the missiles and radars were trailers that had been adapted and converted for use at permanent facilities. Many bases also had their own water treatment and sewage facilities,

which might include wells, pump houses, sewage lagoons, holding tanks, and/or septic tanks (Carlson et al., 1996). Note that the numbers of buildings and the structure types did vary from base to base and the following building descriptions are generalized. C-54 site-specific information is included when available.

2.3.1.1 Control Area

The Control Area consists of the various elements required to track incoming targets and track and control the missile to the target. The support elements for personnel such as barracks, offices and a mess hall were also present at C-54. The various elements in the Control Area were interconnected by a communications cabling system.

Sentry Guardhouse: Small, square buildings of cinder block construction located at the entrances of all Nike sites. Nike sites had secured perimeters encompassed by two lines of fencing and a firebreak (Carlson et al., 1996). Law (1986) did not identify any environmental concerns associated with this structure.

Administration Buildings: The administration building housed administrative support services for the base. The one-story cinder block building usually included a day room, offices for the battery commander and officers, a supply room, a supply office, hobby room, communications room, barber shop, mail room, restroom, and arms storage room (Carlson et al., 1996). Law (1986) did not identify any environmental concerns associated with this structure. USTs may have been associated with these buildings.

Barracks: Large, L-shaped buildings of cinder block construction with slanted roofs. Typically, there were two barracks – one for the battery control personnel and the other for the launch crewman (Carlson et al., 1996). The barracks contained restrooms and shower facilities. Law (1986) did not identify any environmental concerns associated with this structure. USTs may have been associated with these buildings.

Mess Hall: Moderately sized buildings of cinder block construction with slanted roofs and two entry vestibules. This building contained a kitchen, dining area, and boiler room and served as the common eating area for all base personnel (Carlson et al., 1996). Law (1986) did not identify any environmental concerns associated with this structure. USTs may have been associated with these buildings.

Paint and Oil Shed: Small, square buildings with a design and construction similar to the guardhouses (Carlson et al., 1996). These buildings were used to store small amounts of paints, thinners, and solvents. Law (1986) did not identify any environmental concerns associated with this structure. However, small quantities of paints, thinners and solvents may have spilled or leaked near the shed. The specific location of the Paint and Oil Shed at C-54 could not be determined due to lack of information.

Battery Control Trailer: The heart of the Nike missile system, this mobile trailer contained computer equipment, including the displays and controls for the acquisition of targets as well as where the firing of the missiles was orchestrated. The trailer contained the acquisition radar cabinet assembly, the battery control console assembly, the computer equipment, an early warning plotting board, an event recorder, and switchboard cabinet (McMaster et al, 1984; Carlson et al., 1996). Law (1986) did not identify any environmental concerns associated with this structure.

Radar Control Trailer: This trailer housed the target console assembly, the missile console assembly, the radar power assembly and the radar range and receiver cabinet assembly. This trailer was commonly positioned back to back with the Battery Control Trailer. This trailer contained the controls and displays required for the missile-tracking radar (MTR) and target-tracking radar (TTR) operators (McMaster et al, 1984; Carlson et al., 1996). The close proximity allowed for easy access by the personnel manning both trailers. The maximum distance separating these buildings was 25 feet (Carlson et al., 1996). Law (1986) did not identify any environmental concerns associated with this structure.

Low-Power Acquisition Radar (LOPAR): The acquisition radar was used to detect, observe, identify, and designate a target (McMaster et al, 1984). The target once selected was then transferred to the target-tracking radar. This radar was composed of T-shaped acquisition antenna that rotated constantly and was either mounted on a concrete pad or mounted atop a tower assembly. This system was primarily used with the Nike Ajax missile (McMaster et al, 1984; Carlson et al., 1996). In addition to the antenna this was also composed of a receiver, and transmitter. The components were used to detect, observe, identify and designate a selected target. The controls were located in the battery control trailer (McMaster et al, 1984). Law (1986) did not identify any environmental concerns associated with this structure.

Target-Tracking Radar (TTR): This radar tracked the designated target and provided data on the target's position to the computer. The radar was composed of a cone-shaped radar assembly, a receiver, and a transmitter that tracked the flight path of incoming enemy aircraft (McMaster et al, 1984; Carlson et al., 1996). The radar was mounted on a drop bed antenna trailer. The three operator controls and displays for azimuth, elevation and range, were located at the target console in the Radar Control Trailer (McMaster et al, 1984). Law (1986) did not identify any environmental concerns associated with this structure.

Missile-Tracking Radar (MTR): This radar was composed of the missile tracking antenna, receiver, and transmitter (McMaster et al, 1984). The MTR was similar in shape, construction, and function to the TTR. The MTR tracked the flight path of the intercepting missiles (McMaster et al, 1984; Carlson et al., 1996). The operator controls and displays were located at the target console in the Radar Control Trailer. This radar tracked the missile, supplied the computer with missile position data, and provided the communications link for transmitting commands from the computer to the missile (McMaster et al, 1984). Law (1986) did not identify any environmental concerns associated with this structure.

Radar Collimation Mast Assembly: Typically a 60-foot tall radar collimation mast, it was used for testing and adjusting the Missile-Tracking and Target-Tracking Radars (McMaster et al, 1984; Carlson et al., 1996). Spatially the two tracking radars and the mast assembly formed a large triangle with the control trailers located in the middle of the triangle (Carlson et al., 1996). Law (1986) did not identify any environmental concerns associated with this structure.

Maintenance and Spares Trailer: Portable test equipment, spare components, and parts were stored in this trailer. During "march orders," components of the acquisition radar were stored here (McMaster et al, 1984). The specific location of the Maintenance and Spares Trailer at C-54 could not be determined due to a lack of information.

Generator Building: This building housed the diesel-driven generators that powered the radars and Control Area equipment when commercial power was unavailable. Transformers were mounted on a concrete pad adjacent to the cinder block building: diesel fuel for the generators

was stored either in above ground storage tanks (ASTs) or in USTs near the generator buildings (Carlson et al., 1996). Environmental concerns associated with the generator building relate to the storage of fuel for the generators and the possible use of polychlorinated biphenyls (PCBs) in the transformers at the building (Law, 1986).

Motor Pool/Motor Repair Shop: C-54 had a motor pool. These buildings were used for limited maintenance. Individual Nike batteries were not responsible for vehicle maintenance. Instead, vehicles were delivered to the battalion for maintenance. Some minor contamination by solvents, fuels, and lubricants could have occurred (Law, 1986).

Sewage Treatment Plant: Based on aerial photographs, C-54 included a sewage treatment plant at both the Control and Launch Areas. These facilities were used for onsite sewage treatment (Carlson et al., 1996). The sewage treatment plants are no longer in use. Materials most likely to have been disposed of via septic systems include paints and general domestic cleaning products (Law, 1986).

Athletic Court: A level paved surface with associated 10-foot high backboards. It was used for recreational purposes and for physical fitness maintenance of the crewman (Carlson et al., 1996). Law (1986) did not identify any environmental contaminants associated with this structure. The court is distinctive in the aerial photographs as it had a bituminous surface while the ends were concrete.

2.3.1.2 Launch Area

The various missile components were assembled, maintained, and prepared for firing in the Launch Area. The majority of routine maintenance and testing activities for the missiles to ensure flight readiness were conducted here. However, missiles were periodically returned to the Battalion support shop for more extensive maintenance and testing (Law, 1986).

Launch Control Trailer (LCT): Mobile and similar in construction and appearance to the Radar and Battery Control Trailers. This trailer contained the launching control panel, the launching control switchboard, and the test responder. The controls, displays, and communication equipment required to supervise and monitor the launching sections during an engagement were located on the control panel. This trailer functioned as the relay station and control center between the Launch and Control Areas (McMaster et al, 1984; Carlson et al., 1996). Law (1986) did not identify any environmental concerns associated with this structure.

Missile Assembly and Test Building: A large, concrete block building with two large garage-like doors at each end of the building, which enabled missiles to easily be rolled in and out of the building. Missiles were assembled and tested in these buildings before warhead assembly. Older Nike sites that handled the Nike Ajax had a concrete walkway connecting the missile test and assembly building to the acid fueling station (Carlson et al., 1996). Missile assembly and maintenance involved the use of various solvents, anticorrosion products, and paints, as the missiles were assembled and disassembled. General cleaning and degreasing used Stoddard-type solvents (petroleum distillate), carbon tetrachloride, trichloroethane(s), perchlorethene, and trichloroethane(s), and trichloroethene, with minor use of alcohol and acetone. Some painting was also conducted at the missile test and assembly building. The buildings were typically equipped with a full-length drainage system. In most cases, the drainage system was gravity fed and discharged to a small seepage pit or a small system consisting of perforated tile. The

construction of the seepage system varied from site to site depending on local conditions. In some cases, sump discharges may have been directed to surface water drainages (Law, 1986).

No drains or sump discharges were visible at the Missile Assembly and Test Building during the site reconnaissance.

Acid Fueling Station: Only used at bases with Nike Ajax missiles, this consisted of a concrete slab comprised of two mounds and two small depressions. A hoist and platform were used to lift a cask of IRFNA fuel above the missile and allow it to be gravity fed into the missile sustainer prior to its mating with the booster. This operation was performed on a concrete walkway surrounded by an 8- to 10-foot high earthen berm (Carlson et al., 1996). Due to the hazards associated with IRFNA, its use was governed by a fairly strict protocol. Environmental contamination would be limited to incidental releases. Additionally, IRFNA was both reactive and volatile and would not be persistent in the environment (Law, 1986).

Acid Storage Shed: A small metal storage shed with a nearby emergency shower in case of accidental contact with the dangerous chemicals and fuels. This shed was located near the acid fueling station. Law (1986) did not identify any environmental concerns associated with this structure. However, small quantities of stored materials may have spilled or leaked near the shed.

Underground Storage Magazines and Launchers: Underground magazines were standard and were commonly found in groups of three. Each underground magazine had an associated launch pad and large elevator doors that opened downwards. The underground magazines had a large elevator to carry missiles to the surface (Carlson et al., 1996). The hydraulic system for each elevator had oil tanks and sumps with a capacity of 271 to 311 gallons (Army, 1959). The launching control cabinet was located in a room in the magazine (or in a revetment in above ground installations) and contained the necessary controls, indicators, and communications facilities to allow the launching section to control the preparation and firing of its missiles. The cabinet was also used to coordinate the activities of the launching section with the launching control panel operator in the launching control trailer (McMaster et al, 1984).

The magazines typically had a floor drainage system that permitted waste materials to be washed to a central sump under the missile elevator. A pump would deliver the water and waste to a seepage system or ground surface. Volatile organics (i.e., benzene, carbon tetrachloride, tetrachloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene) were used in the cleaning and maintenance of the missiles (Law, 1986). The transformers may have contained PCBs.

Generator Building: This building housed diesel-driven generators that powered the elevators and launch area equipment when commercial power was unavailable. Transformers were mounted on a concrete pad adjacent to the building. Diesel fuel for the generators was stored either in ASTs or USTs near the generator buildings (Carlson et al., 1996). Environmental concerns associated with the generator building relate to the storage of fuel for the generators and the possible use of PCBs in the transformers at the building (Law, 1986).

Ready Building: This building usually included a squad room, dining room, heater room and toilet. The building was typically one-story with cinder-block walls. Law (1986) did not identify any environmental concerns associated with this structure. USTs may have been associated with these buildings.

Pump House/Cistern: C-54 contains a pump house and cistern for water collection. The water from the well is used for nonpotable needs according to a site representative.

2.4 Potential Contamination

Four operations were carried out in the Launch Area that may have resulted in contamination. These included missile assembly and disassembly, missile fueling and warheading, missile maintenance and testing, and general launcher and magazine maintenance. Missile assembly was conducted at the Missile Assembly and Test Building. Some painting was conducted on an as-needed basis at the Missile Assembly and Test Building. Solvents were used for cleaning and degreasing and may have included Stoddard-type solvents, carbon tetrachloride, trichloroethane, perchloroethene, and trichloroethene. Washout from maintenance activities may have been collected in sumps and pumped to seepage pits or leach fields. Some sites had seepage systems that consisted of drainage tiles and/or seepage pits. The construction of the seepage system varied from site to site depending on local conditions; in some cases, sump discharges were directed to surface water drainages (Law, 1986). No construction drawings that may identify the location of sumps or seepage systems were located for C-54. There was no visual evidence of sump discharges identified during the June/July 2001 site reconnaissance.

Missile fueling and warheading was conducted at the Acid Fueling Station. JP-4 fuel was used in the sustainer motors of Ajax missiles and leakage could present some potential for contamination (Law, 1986).

Missile maintenance and testing was conducted in the magazine, above ground at the launcher, the fueling area and the Missile Assembly and Test Building. Simple procedures not involving the fuels or warhead or related electronics could be handled in the magazines. Other procedures required the missile be taken above ground or the fueling area. Major structural repairs required the missile be defueled and returned to the assembly building. Maintenance and repair of corrosion or hydraulic problems were most common. Phosphoric acid in alcohol solution, alodine powder, and chromates in the form of chromium trioxide and sodium dichromate were used for removal of corrosion from metal parts. Painting of missile components also involved the use of chromium and lead (Law, 1986).

Maintenance of the structural, mechanical and hydraulic systems of the launcher and magazine required cleaning, painting and hydraulic work. The magazines stored missiles and contained storage racks and a rail system used to deliver the missiles to the elevator. Above ground, missiles were moved on rails to the launchers. Rail handling of the missiles required that all portions of the rails, racks and dolly wheels were clean and free of corrosion. The rail system was cleaned with metal brushes and solvent. Naptha type solvents were routinely used to side down the rails (Law, 1986).

Fuels were stored for electric power generation and heating. Fuel tanks were typically buried underground. As the site has been redeveloped, no evidence of a seepage system or USTs was apparent during the June/July 2001 site reconnaissance.

The variety and quantity of chemicals used at the Control Area was significantly less than that in the Launch Area. The operations that may have resulted in contamination include vehicle maintenance at the motor pool building and fuel storage (Law, 1986). No evidence of tanks was apparent during the June/July 2001 site reconnaissance. According to an Andrew Corporation

site representative all USTs were removed from the Control Area in 1985 and the motor pool drain was capped in the early 1990s (Plexus, 2001).

Waste solvent could be saved for POL Turn-In or, perhaps more often, was washed into drains that had a surface leaching system connected. Large quantities of certain solvents would evaporate during use. This particularly applies to the chlorinated solvents, such as carbon tetrachloride. The effects of surface leaching systems on contamination, depends greatly on the depth of the system, soil types, and local climate. Arid, sandy environments encourage further evaporation and rapid leaching of unevaporated materials. Finer grained soils (clays or silts) with routine rainfall discourage evaporation and decelerate leaching of some solvents.

Lubricants, sealants and paints are less adapted to disposal by drainage systems, although this was a probable practice for small quantities of left-over or waste material. Cans of waste and left-over material were dumped as solid waste which was delivered to local landfills.

2.5 Environmental Activities

USACE contracted International Technology Corporation (IT) to conduct a Contamination Evaluation at the Launch Area of C-54 in 1990. The purpose of the evaluation was to determine the presence or absence of chemical contamination, which may have been caused by Army activities. In order to accomplish this objective, samples were collected and analyzed from two monitoring wells, surface water, silo water and soil borings. All samples were analyzed for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH) and total metals. The monitoring wells were placed north of the Acid Fueling Station and the Missile Assembly and Test building. Monitoring wells were drilled to 35 and 45.5 feet. Water was encountered at 11 and 27 feet below ground surface (bgs), respectively. A third well was drilled to 50 feet without encountering water. Four soil samples were collected at three feet using a hand auger. The sample locations were selected in areas considered to have the greatest potential for contamination. These areas included near the Acid Storage Shed, in the Acid Fueling Station and in the launch silo area. The fourth sample was collected near the entrance and was considered a background sample. Silo water was sampled in the two northern most silos. Surface water was collected from two swampy areas in the vicinity of the former Nike site. One swampy area is to the north-northeast of the site, and the other area is onsite behind the Acid Fueling Station (IT, 1990).

Sampling results indicated the following: levels of arsenic, cadmium, chromium and lead were detected in groundwater at or near the maximum contaminant levels (MCLs); silo water samples contained levels of cadmium, chromium, lead, and silver above the MCLs; TPH were present in soils, silo water and surface water samples, but at low levels. Sampling results are located in Appendix B. The investigation concluded that the source of contaminants could not be defined based upon the length of time that had elapsed since Department of Defense (DoD) use of the site (IT, 1990).

Three USTs were removed from the Village of Orland Park DPW portion of the Launch Area in 1994 and replaced with new tanks; however, these tanks were not associated with the former Nike site. Tank documentation is located in Appendix C. According to a site representative at the U.S. Army Reserve, one UST has been removed from the site; however, database records indicate that three USTs have been closed at the site. No documentation was located for this tank (Plexus, 2001).

2.6 Review of Historic Aerial Photographs

Historic aerial photography covering the period from 1955 through 1999 was obtained from readily available governmental archives and private vendors: ASCS, (Salt Lake, Utah), USGS, (Sioux Falls, South Dakota), Chicago Aerial Photo Services, Inc. (CAPS), (Bensenville, Illinois), and Sidwell Company, (St. Charles, Illinois). The photography was examined under a stereoscope to identify any significant areas of disturbance. The photographs reviewed are as follows:

DATE	SCALE (Approximate)	AGENCY	MISSION CODE	EXPOSURES
March 29, 1955	1:20,000	CAPS	---	376 and 377
April 21, 1955	1:20,000	CAPS	---	1679 and 1680
April 7, 1958	1:20,000	CAPS	---	854 thru 856 746 and 747
April 20, 1962	1:24,000	USGS	GS-VAHU	3-62 thru 3-64
September 11, 1967	1:20,000	ASCS	BWQ	1HH-45 and 46
March 27, 1973	1:24,000	USGS	GS-VDCR	2-406 thru 2-408
March 22, 1976	1:24,000	Sidwell	---	1918 and 1921
November 25, 1980	1:24,000	CAPS	36B	64 and 66
April 16, 1985	1:24,000	CAPS	85100 36B	33 and 34
April 12, 1988	1:40,000	USGS	NAPP	790-171 and 172
April 4, 1993	1:40,000	USGS	NAPP	5738-24 and 25
April 17, 1998	1:40,000	USGS	NAPP	10398-121 and 122
April 24, 1999	1:24,000	CAPS	99100 36B	31 and 32

Graphical line work delineating particular areas or significant features has been employed in order to focus the readers attention to features or locations that may not be readily discernable in this small scale collection of photography of the former Nike Site. The Launch and Control Areas are discussed separately below.

2.6.1 Control Area

1955 - The site is an agricultural tract (Figure 2-6). The site is located at the southwest corner of the intersection of 153rd Street and a railroad right-of-way and is situated on the crest of a small "hill" that rises from 10 to 30 feet above the surrounding terrain. No drainage courses other than roadside ditches and naturally occurring swales are evident in the general area.

Several scattered, small farmsteads are present in the vicinity. A single small industrial facility (Andrew Corporation) is located north of 153rd Street. No discernible evidence of conditions environmental concern is observed within the future bounds of the site.

1958 - The site appears fully operational at this time and is comprised of several distinct functional areas including administrative offices, barracks, missile guidance/tracking facilities, and support facilities (Figure 2-7).

A motor pool/shop area is located in the northeastern portion of the site, adjacent to a large parking lot. The motor pool area includes a vehicle maintenance wash rack. Several small piles of multi-toned, earthen-like materials, unidentifiable equipment or containers, and two small, rectangular pads (possibly concrete) are present near the wash rack. Directly north of the pads are two buildings. The larger building may be the main shop facility. Tonal variations in the soil of the unimproved road/parking area found on the south side of this building suggest that liquids from the building may have flowed into this open area in the recent past. Another area of discoloration also appears to the west. This may indicate washout from the building or may be the result of precipitation.

Located on the south side of the smaller building is a dark-toned, rectangular feature that measures roughly 20 feet long by 10 feet wide. This feature lies flush with the surrounding surface and appears to "shimmer" when viewed stereoscopically. This signature is typically associated with bodies of liquid. The reason for this liquid body is not apparent in the aerial photograph and may warrant further investigation.

Wastewater (sewage) management is handled on-site. The head of the plant and its two settling/drying beds are seen in the far eastern portion of the site, south of the large parking lot. Each of the beds is square, measures 60 feet on each side, and contains 4 "aeration" or inlet devices. Scarring of the soil west of the plant traces the path of the influent main that leads to the plant from the site's main operational and support facilities. Surface water runoff management is controlled by topography and ditching. Runoff flows radially from the site; the main drainage ways are presented in Figure 2-7.

Scarring is evident in the southeast corner of the site. Vehicular tracks and grading patterns suggest that the disturbance is relatively recent.

The surrounding area remains generally rural. The Andrew Corporation facility has expanded and may have its own disposal site (not shown in Figure 2-7) located north of the facility. This possible disposal area contains multi-toned materials of unidentifiable composition and is situated roughly 1,000 feet from the Control Area's northern fence.

- 1962 - Based upon historical information the Nike site activities discontinued in 1961; however, very little visible change in the appearance of the site is evident since 1958. The motor pool/shop area remains active, but the previously noted dark-toned rectangular feature and nearby discolored surfaces are no longer visible. No change in the wastewater plant is noted; however, the large, scarred area in the southeastern corner of the site is beginning to revegetate. The light-toned soils of this scarred area still delineate the footprint of this disturbance. No discernible evidence of conditions of environmental concern within the site is observed at this time.

The Andrew Corporation facility remains operational and has grown in size since 1958. The possible disposal area is still present and has received a considerable amount of material in the past 4 years. Parking facilities and open storage yards have overtaken much of the disposal area. A new rail spur that serves the facility also traverses the disposal site.

- 1967 - The site was reported excess by the GSA in 1964 and the lease was terminated with Andrew Corporation. Tracking and targeting radar facilities have been dismantled. Large quantities of stored materials are seen within the former installation. These

unidentified materials appear to be comprised of various-sized rectangular and cylindrical items, are primarily found in the former motor pool/shop area and adjacent parking lots. This area contains large numbers of light-toned cylindrical items, many of which appear from 4 to 8 feet in diameter. A smaller concentration of rectangular items is staged in the vicinity of the former radar area near the southern fence line. None of the stored materials exhibit evidence of being discarded or in poor condition.

An unusual, dark-toned signature located on the eastern side of a former administrative building appears prominently in the photograph (annotated on Figure 2-8). Due to its dense, dark tone and the surrounding relief of the building and nearby terrain, it is difficult to determine whether this unidentifiable material is present in a large pile or is instead a large flat-lying feature. The shape of the signature, especially on the eastern and southern sides, suggests that it is contained by a wall or fencing. It is readily accessible to vehicular traffic via a service lane, which permits access on the eastern side of the building. Its general position, size, and appearance suggest it is not being stockpiled or held in a manner that other materials on-site are being managed.

The scarring in the southeastern portion of the site is no longer apparent, except for a small "highlight" within the western portion of the former footprint.

The wastewater plant remains intact but may not be operational at this time. The inlets in the northern bed appear to be overgrown with vegetation; this is not the case with the southern bed where the inlets are clearly visible.

The Andrew Corporation facility has expanded. Disposal operations north of the site appear to have diminished by this time.

- 1973 - The presence of stored materials on-site has been greatly reduced since 1967. Storage activity is concentrated around the former motor pool/shop area. Cylindrical objects with the appearance of concrete (or metal) drainage culverts and/or piping are the dominant items observed on-site (Figure 2-8). These items appear organized and do not appear to be managed as waste materials.

The dark-toned signature previously observed east of the former administrative building is no longer visible.

A ground scar located in the southeast portion of the site appears to have been recently created. The rectangular scar measures approximately 150 feet long by 100 feet wide and has a "furrowed" appearance.

A small pocket of dark-toned material is visible along the east shoulder of the access road that leads to the southwest part of the site.

- 1976 - The types and numbers of stored materials observed on-site have increased significantly since 1973.

The rectangular surface scar noted in the southeast portion in 1973 has become overgrown by vegetation and exhibits a slightly depressed appearance.

A large communications antenna is present in the southwest portion of the site and is situated on one of the former radar pads (annotated on Figure 2-9). This general area continues to be used for communications devices in subsequent years of coverage.

- 1980 - Although the types of materials observed on-site have changed significantly, the level of activity is essentially the same. A slight discoloration of the road and parking surface south of the main motor pool shop is observed in this photography. This may be caused by moisture from precipitation or the release of a substance.

The material located along the shoulder of the access road leading to the southwest portion of the site is no longer present. The former rectangular scar located in this same general area is still evident, but overgrown by vegetation. This depression is still apparent and may actually have increased in size since 1976.

- 1985 - Several of the buildings have been removed (Figure 2-9). One of the former building pads currently contains numerous dump truck-sized loads of light-toned earthen materials.

The former installation remains in active use, but the type of activity has noticeably changed since 1980. The former motor pool/shop area has a generally unkempt appearance and the vegetated area south of the main shop appears to contain assorted debris and discarded items. The "wash rack" is no longer present. Discoloration of the surface of the road network found in this general area is evident; however, it is uncertain whether this condition is attributable to precipitation or to releases of substances.

Storage operations appear to be restricted to the former parking lot that occupies the northeast corner of the site. This lot currently contains 25 large, light-toned, unidentifiable objects. These objects are also seen in the open storage lots behind the Andrew Corporation facility.

Quantities of light-toned debris or earthen-like materials have been deposited in and around the headworks of the former wastewater plant. No other changes in the appearance of the plant are noted.

A possible addition to the communications antenna area is seen in this year of coverage. A linear, "fence-like" array roughly parallels the site's southern fence line.

- 1988 - All but three of the former military buildings associated with the site have been removed by this time. (The structures that have been removed since 1985 are delineated (broken lines) in Figure 2-10.) The former wastewater plant also appears to have been demolished (annotated on Figure 2-10). The high altitude and poor resolution of this particular coverage precludes a detailed review of the site and conditions; however, the main motor pool shop and its surrounding area continued to exhibit an unkempt appearance. No evidence of any storage operations is observed. A new communications tower has been constructed in the northwest corner of the site (annotated on Figure 2-10).
- 1993 - Extensive use is being made of the site by Andrew Corporation. A large, new storage yard has been developed south of the former motor pool shop. This area, which was observed in years past as being used for materials storage, has been redeveloped by 1993. No other features of significant note are observed within the site at this time.

- 1998/99 - The final two years of site coverage show extensive storage activity within the former installation. Figure 2-10 (dated 1999), which provides a detailed view of this activity, clearly shows materials that are once again common with materials stored at the Andrew Corporation facility.

The large open and heavily scarred area at the center of the site is a recent (1999) condition not seen in the 1998 photography. The 1998 coverage showed this area as being used for the disposal of light-toned, earthen materials. Small trees and vegetative ground cover were prominent in the area at that time, but most were removed within a year of the date of that photography. The current view of the site (1999)(Figure 2-10) shows that it has been extensively cleared. Discoloration in the western portion of the scarred area shows evidence of the flow of liquid. These "flow" signatures are seen to originate from a small collection of materials situated at the base of the grass-covered slope of the hill that occupies the southern portion of the site. The signature then turns eastward through the disturbed area towards a low-lying area containing several trees. Other areas of discoloration in this same general area may also be associated with the flow of liquid(s), which may represent new drainage patterns created by clearing of the area.

Large quantities of earthen materials, initially visible in the 1998 photography, appear to have been deposited in the lowland area along the western perimeter fence. Partial grading of the material is apparent; however, numerous dump truck-sized loads of material are also evident.

A rubble pile is seen in the eastern portion of the site. Slight scarring in the southwest portion of the site remains visible.

2.6.2 Launch Area

1955 - The site of the future Launch Area is an agricultural tract (Figure 2-11). The site is located north of the intersection of U.S. Routes 45 and 6 and is situated on level ground. Drainage courses in the vicinity of the site are limited to a ditch located approximately 1,000 feet northwest of the site. Several scattered, large farmsteads, a small commercial area (e.g., gas stations, motels) at the intersection of the highways, and what may be a composting or peat mining facility located to the west, are the only significant cultural developments in the surrounding environs. No discernible evidence of conditions of environmental concern is observed.

1958 - The site is operational and is comprised of a single battery containing three magazines. A bermed area located at the northeastern corner of the launch pad is used for fueling of the missiles. A small wastewater plant comprised of a single drying/leaching bed is present in the eastern portion of the site. Scarring within the site is minimal and where present, appears to be associated with construction of the site. The most prominent scar is visible east of the generator building. Although the cause of this specific scar is unknown, it appears more recent than others on-site. The general appearance and location of this feature does not suggest that it is caused by disposal activity (Figure 2-12). No discernible evidence of conditions of environmental concern is observed.

Surface water runoff management is controlled by topography and ditching. Runoff flows to the north from the site; the main drainage ways are presented in Figure 2-12.

1962 - Based on historical information operations at the Nike site ceased in 1961. A new facility is located on the eastern portion of the former Launch Area. This facility is U.S. Army Reserve Area Organization Maintenance Shop No. 45 (Figure 2-13). The site has its own

wastewater plant, is fenced, and separated from the Launch Area. An additional structure located immediately north of the site appears to be a commercial facility.

Little change in the appearance of the site is noted at this time. Spotty vegetative cover behind the maintenance building and in the vicinity of the site's wastewater plant gives this localized area a generally disturbed appearance. Several unidentifiable pieces of equipment and a drainage ditch are located in this portion of the site and were not present in the 1958 coverage. Drainage is generally controlled on site by a series of roadside ditches (Figure 2-12). Most surface water appears to flow northward; however, the direction of flow of waters that collect within the ditch situated around the perimeter of the launch pad could not be determined.

A small pile of possible refuse/debris appears in the vicinity of a round, ground level "pad" or structure located along the southern perimeter fence. This discarded material seems to be partially located in a shallow trench. No additional features of environmental significance are evident at this time.

- 1967 - The missile transport rails and launchers have been removed from the pad. No new features of note are observed within the grounds of the site and no visual evidence of the refuse/debris deposit previously seen on the southern side of the installation is observed.
- 1973 - The site appears well maintained. Historical data states that a portion of the Launch Area was "quitclaimed to the Village of Orland Park" in 1971 and it subsequently served as the Orland Park Public Works Garage.

No changes in the configuration of the former site or its structures are observed at this time. The only features of note are three fenced compounds that had been created within each of the launch magazines on the former pad. Each of the compounds contains an assortment of unidentifiable items.

Extensive excavation and fill operations are being undertaken on the northern, western, and southern sides of the former Nike installation. Most of the excavation activity appears to be associated with possible peat mining operations that are thought to be present in the general vicinity. Fill activity is concentrated north of the site along the western shoulder of U.S. Route 45 (annotated on Figure 2-14). The composition of the materials being deposited in this vicinity is earthen-like.

- 1976 - Vehicle storage is prevalent within the former site at this time. Storage operations within the fenced compounds found on the old launch pad continue; the quantities of materials present in these areas have increased since 1973.

A large ground scar in the southwestern portion of the site is the largest single disturbance within the facility. This scarred area appears to contain fill material, most of which has been spread out over the area. Three dump truck-sized mounds of earthen material are also visible in this area. The purpose of the disturbance in this area is not discernible from the photography. Other vehicle scars, erosion tracks, and discolorations are present within the site; however, none of these features appear environmentally significant.

- 1980 - The site has been partitioned by a chain link fence (division line fence) and is divided into eastern and western parcels. The eastern parcel incorporates all the launch control facilities and grounds as far west as the blast wall berm. This eastern area has clearly

been incorporated into the grounds of the adjacent Army Reserve facility and continues to host numerous vehicles and equipment. The grounds of this area are generally well maintained. All buildings except the small structure located near the entrance of the Launch Site remain standing. Evidence of two recent flows of liquid is seen in the vicinity of the former missile maintenance building found on-site (annotated on Figure 2-15). One of these signatures appears to originate from the western side of the aforementioned building and "flows" toward a nearby drainage ditch however, it is uncertain whether this is attributable to precipitation or to liquid releases.

The western half of the former Launch Area is clearly the domain of the municipal Garage. Miscellaneous materials and objects are seen staged throughout the pad area; none of the fenced compounds observed in prior years are evident. A large building has been constructed on the southern end of the pad in the area where a large disturbance and fill activity was reported in 1976. Fueling pumps for the facility are visible on the eastern side of this building.

A large quantity of mounded material has been staged midway along the eastern fence of the Public Works facility. Most of the material is light-toned (possibly road salt), but discoloration in an adjacent area suggests other types of material may be managed in this general area. No visual evidence of disposal activity is observed within the grounds of the Public Works facility.

The deposition of fill material in several areas, especially west of U.S. Route 45, has noticeably raised the elevation of the terrain and has reduced the extent of the wetland acreage in the general vicinity.

- 1985 - The fence line that once separated the original Army Reserve facility from the missile area has been removed. Heavy ground scarring in the eastern area suggests grading and filling of the terrain has occurred since 1980. No features of environmental significance are seen within this area.

The Public Works facility portion of the site can be characterized as an open storage yard. Large quantities of equipment and materials are currently visible in the area. Conditions in the area are generally the same as that observed in 1980, but the amount of stored materials is greater. The only specific features of note within the yard are a concentration of objects that may be 55-gallon drums. These items are located along the western perimeter of the yard. No visual evidence of past or present releases is noted in or around these features.

Off-site conditions continue to evolve as grading, filling, and drainage ditches have significantly modified the surrounding site area. With respect to drainage, a new pattern of linear ditches has been developed to move surface runoff westward and away from the facility. This system also drains the wetland area north of the site, as shown in Figure 2-15. Fill activity has been wide spread in the general area since 1980; however, the most notable fill activity is currently centered in the area on the eastern side of the wetlands. The fill being deposited appears to be comprised of light-toned earthen materials; however, quantities of debris/refuse material are also evident. These debris/refuse deposits are visible along the northern edge of the fill and are delineated in Figure 2-14.

1988 - A second large building has been constructed on the grounds of the Public Works facility since 1985. This building is situated along the division line fence, south of the blast wall berm. A new access road that enters the site from the north has been developed. This access road appears to be unpaved. The poor resolution of this particular year of high altitude aerial coverage precludes a detailed inspection of the site; however, the area that previously (1985) hosted the possible cylindrical objects (possible drums) appears to have been cleared of any type of openly stored materials.

Activity in the Army Reserve portion of the former installation remains unchanged since 1985. No significant physical changes in the area or types of operation conducted within this site are evident.

A shopping center has been constructed on the south side of the site (annotated on Figure 2-15). The wetland area to the north continues to receive fill.

1993 - Construction of another building at the Public Works facility is observed (annotated on Figure 2-16). The new building is situated between the two previous structures. Access to the site is currently available from three separate entrances. The northern storage area is primarily accessible by the new road (1988) (annotated on Figure 2-16) that enters the site from the north. Access to the buildings are primarily available by the original access road that borders Shop No. 45 or by a new entrance that leads through the freight/service yard at the rear of the adjacent shopping mall.

Activity is increasingly being conducted in and around the old blast wall berm of the former missile site. Storage bins are evident around the outer edges of the berm, which was converted to a "horseshoe-shaped" earthwork sometime after 1976. Unidentifiable operations, which have been observed within the confines of the berm for several years, continue to remain visible. The only other feature of note within the general storage area is a faint linear feature located near the northern access gate. This dark-toned signature is situated in an open, possibly grass-covered area (annotated on Figure 2-16).

Operations at the Army Reserve portion of the former Nike installation are unchanged.

Development of housing tracts south and west of the former Launch Area is apparent. A small fill area is located just outside the northern Public Works facility entrance. The fill area is comprised of numerous dump truck-sized mounds of multi-toned earthen materials. Some grading of these deposits has occurred in areas immediately adjacent to the shoulder of the access road. The drainage channel that skirts the perimeter of the DPW facility still appears to provide an outlet for waters from this area.

1998/99 - A new public road (South Ravinia Avenue) is the primary entry point into the Public Works facility (Figure 2-16). A variety of earthen-like substances stored in bins and an assortment of equipment, vehicles, and containers are still stored around the perimeter of the bermed area. Two of the former Nike missile elevators remain visible on the launch pad. Improvements within the property since 1993 include:

- A new vehicle fuel station with a separate gated entrance;
- A small open storage yard on the south side of the facility; and
- A possible weapons range located within the bermed area. The weapons range is likely associated with police activity as police vehicles are parked in the vicinity.

The grounds of Army Reserve facility are virtually unchanged since 1993.

Additional housing, construction of South Ravinia Avenue, and removal of the small commercial facility that was located north of Army Reserve facility are the most notable changes to the outlying area since 1993. Surrounding undeveloped tracts of land historically impacted by mining and fill operations remain.

2.7 Site Reconnaissance

The site reconnaissance of the C-54 Control Area was conducted by Geoff Carton and Barbara Seymour of Plexus Scientific Corporation on June 29 and July 2, 2001. Andrew Corporation's Plant and Environmental Engineer, John Jawor provided a tour of the former Control Area. Mr. Jawor provided a current site drawing and an aerial photograph of the facility. The former Control Area was toured and observed for power lines, any signs of hazardous waste/spillage, storm drains, stressed vegetation, fire hydrants, manholes, playgrounds, signs of the former Control Area, underground storage tanks, wells, and anything else significant to the PA study. There was no indication of underground storage tanks in the area nor were there any signs of hazardous waste/spillage. Ground scarring and discolorations noted in the aerial analysis were not evident during the site reconnaissance. Three of the original Control Area buildings remain in use by Andrew Corporation. The buildings include a barracks, barracks/mess hall and the former motor pool. Mr. John Galvan, the Production Services Manager at Andrew Corporation, was interviewed on June 29, 2001. He stated that Andrew Corporation obtains water from a well located on the north side of the Andrew Corporation site, which is located north of the former Control Area. The well water is tested monthly; however, Andrew Corporation could not release the water test results. Additionally, Mr. Jawor stated Andrew Corporation capped the well located within the Control Area in the early 1990s. Andrew Corporation also removed five USTs from the Control Area in 1985. All of the tanks held heating fuel. According to Mr. Galvan all USTs have been removed from the Control Area (Plexus, 2001). Surface water drainage was observed to follow the approximate pathways depicted in Figure 2-1.

The perimeter of the site was studied, noting drainage, schools, residences, playgrounds, and parks. The former Control Area is bordered by the Andrew Corporation facilities to the north; Centennial Park to the east; agricultural land to the south; and a residential area to the west (Plexus, 2001).

The site reconnaissance of the former Launch Area was performed on July 2, 2001. The Launch Area was walked and observed for power lines, signs of hazardous waste/spillage, storm drains, stressed vegetation, fire hydrants, manholes, playgrounds, signs of the former Launch Area, USTs, wells, and anything else significant to the PA study. Mr. Peter Casey, the Director of Public Works for the Village of Orland Park provided a tour of the portion of the Launch Area, which is now the DPW facility. The underground magazines are no longer in use. They have been filled and a building and parking lot have been constructed on top of the magazines. Two USTs, not associated with the former Nike site, were removed from the site in the early 1990s. At the approximate location of the former acid refueling station, there is a shooting range used by the local police department. There was no evidence of drains in this area (Plexus, 2001).

Mr. Thomas Cave of the U.S. Army Reserve provided a tour of the portion of the former Launch Area used by the Army Reserve. This portion of the site is a vehicle maintenance facility. Four of the former Nike site buildings remain. These buildings include the Generator Building, the

Missile Assembly and Test Building, the Ready Building and the Pump House. In addition, the concrete pad for the Control Van and the water cistern remain onsite. The Army Reserve has added additional structures to the site. The Missile Assembly and Test Building is used for storage. According to Mr. Cave, one UST has been removed from the site. The former sewage treatment plant at the Launch Area is now a gravel parking lot. According to Mr. Cave, the well onsite is used for nonpotable water needs. This is the original well associated with the Nike site (Plexus, 2001). Surface water drainage was observed to follow the approximate pathways depicted in Figure 2-3.

According to Mr. Casey, the city well is no longer in use except by the Illinois State Water Survey. All residents and businesses are on city water, which comes from Lake Michigan.

All relevant information from the site reconnaissance is included in the appropriate sections of the PA. Photographs from the site reconnaissance are presented in Appendix D.

2.8 Database Search

A search of readily available records (state and federal environmental databases) was conducted to identify documentation of environmental concerns relating to the former Nike Missile Site C-54 or nearby properties that may impact the site. The search was conducted in accordance with the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments (E 1527-97); a search of reasonably ascertainable government records for the site and within the ASTM specified radii was conducted. Table E-1 lists the databases searched. Table 2-1 presents a list of the facilities identified within a one-mile radius of the Launch and Control Areas. There were no facilities identified within one mile of the Control Area. Two leaking underground storage tanks (LUSTs) have been identified at the former Launch Area. Three additional LUST incidents have been reported within one mile of the Launch Area. There are five registered USTs located at the Department of Public Works portion of the Launch Area. Three USTs at the Army Reserve portion of the site have been reported as closed. One Resource Conservation and Recovery Information System (RCRIS) Large Quantity Generator is located within one-half mile of the Launch Area. The full results of the database search are presented as Appendix E.

TABLE 2-1: LISTED SITES WITHIN 1-MILE RADIUS FORMER NIKE MISSILE SITE C-54, ORLAND PARK, ILLINOIS

Site Name	Listing	Site Address	Directions and Distance from Site	Remarks
Control Area				
None				
Launch Area				
Village of Orland Park	LUST ¹	15655 Ravinia Ave	At Launch Area	Incident No. 941974 Product Type: Unleaded gas, Diesel Notice of Release Sent: 9/6/1994 Free Product Report received: 11/10/1994 Corrective Action Completion Report Approved: 02/03/1998
Village of Orland Park	UST ²	15655 Ravinia Ave	At Launch Area	Five Active Tanks – 2-3000 g (gasoline), 1000 g (diesel), 10,000 g (diesel), 10,000 g (gasoline)
US Army Reserve AMSA #45	LUST	15750 South La Grange Road	At Launch Area	Incident No. 933010 Product Type: Diesel Notice of Release Sent: 12/1/1993 20 Day Report Received: 12/20/1993 45 Day Report Received: 4/14/94
US Army Reserve AMSA #45	UST	15750 South La Grange Road	At Launch Area	Three closed tanks - 6000 g (Diesel), 5000 g (not reported), 2500 g (diesel)
Sparks	FINDS ³	9276 W. 159 th Street	South-south east 0.25 to 0.5 miles	

¹ LUST – leaking underground storage tank

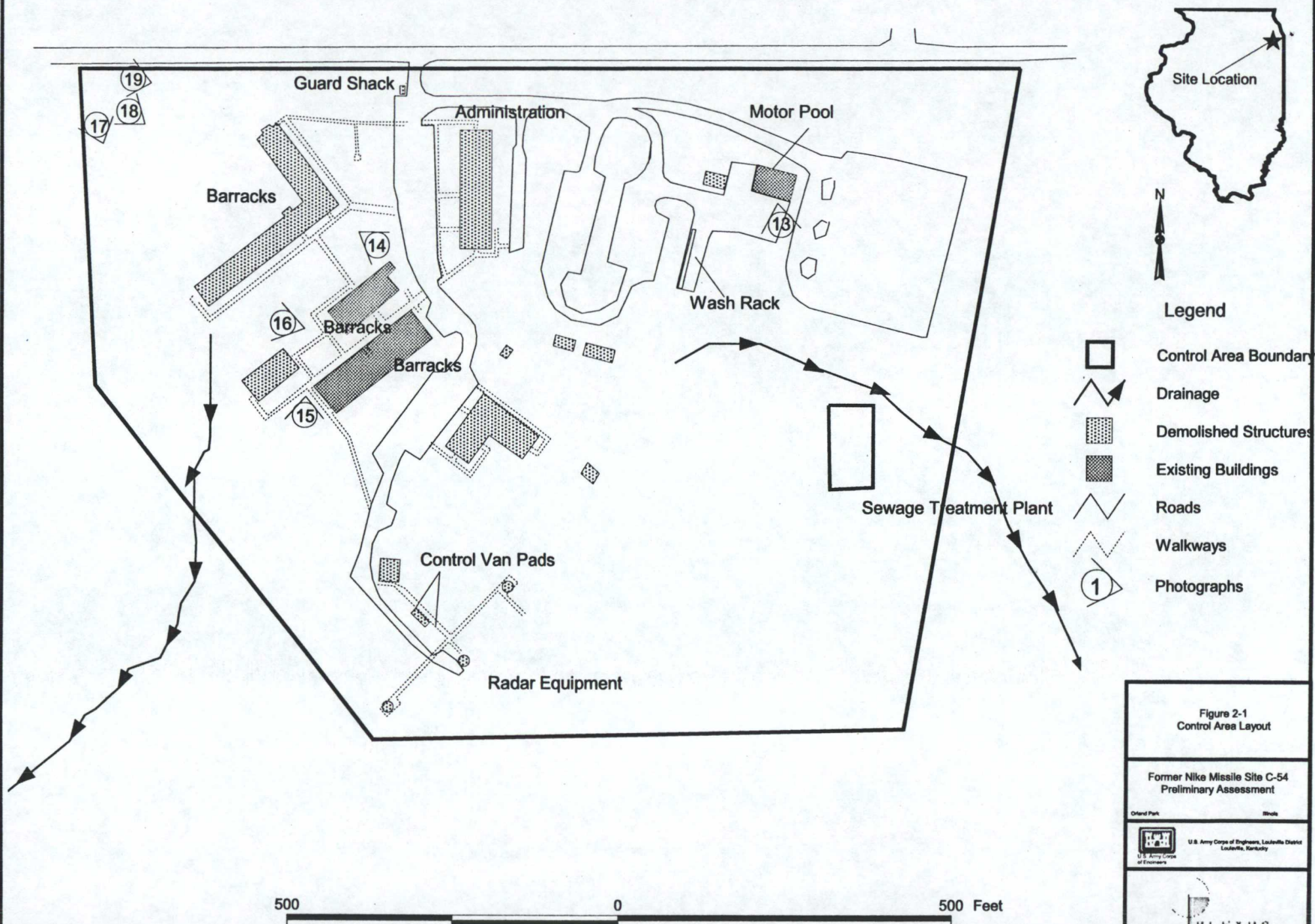
² UST – underground storage tank

³ FINDS – Facility Index System

Site Name	Listing	Site Address	Directions and Distance from Site	Remarks
Sparks	RCRIS-LQG ⁴	9276 W. 159 th Street	South-south east 0.25 to 0.5 miles	No violations found
Sparks	LUST	9276 W. 159 th Street	South-south east 0.25 to 0.5 miles	Incident No. 970908 Product Type: Petroleum Notice of Release Sent: 6/3/1997 Corrective Action Completion Report Approved: 02/24/1998
Orland Park Rental, Inc.	LUST	9550 West 159 th Street	South west 0.5 to 1 mile	Incident No. 921501 Product Type: Gasoline Notice of Release Sent: 6/8/1992 Corrective Action Completion Report Received: 2/5/2001
Orland Park Rental, Inc.	SRP ⁵	9550 West 159 th Street	South west 0.5 to 1 mile	Date Enrolled: 12/8/1997 Not Active
G. Cooper Oil Co. Inc.	LUST	9500 West 159 th Street	South west 0.5 to 1 mile	Incident No. 20000221 Product Type: Diesel Notice of Release Sent: 8/13/2001

⁴ RCRIS – LQG – Resource Conservation and Recovery Information System, Large Quantity Generator

⁵ SRP – Site Remediation Program Database



Source: CAPS Aerial Photograph, April 7, 1958

Figure 2-1
Control Area Layout

Former Nike Missile Site C-54
Preliminary Assessment

Orlando Park

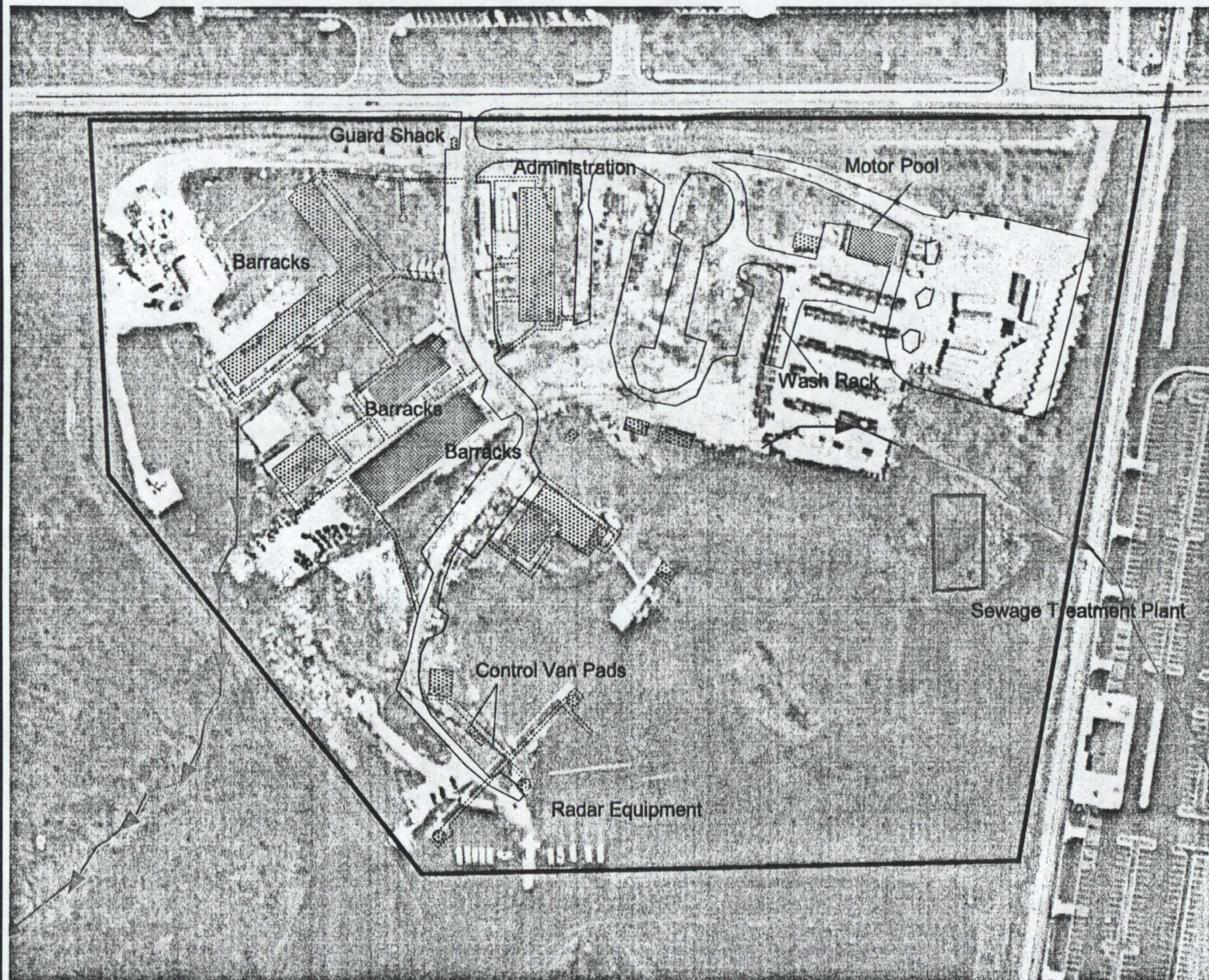


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Louisville, Kentucky

Project No.
6000-000

PLEXUS
CORPORATION

File No.
6000-000



Legend

- Control Area Boundary
- Drainage
- Demolished Structures
- Existing Buildings
- Roads
- Walkways

Figure 2-2
Control Area Overlay

Former Nike Missile Site C-54
Preliminary Assessment

Orland Park

Illinois



U.S. Army Corps of Engineers, Louisville District
Louisville, Kentucky



Project No.

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500 Feet

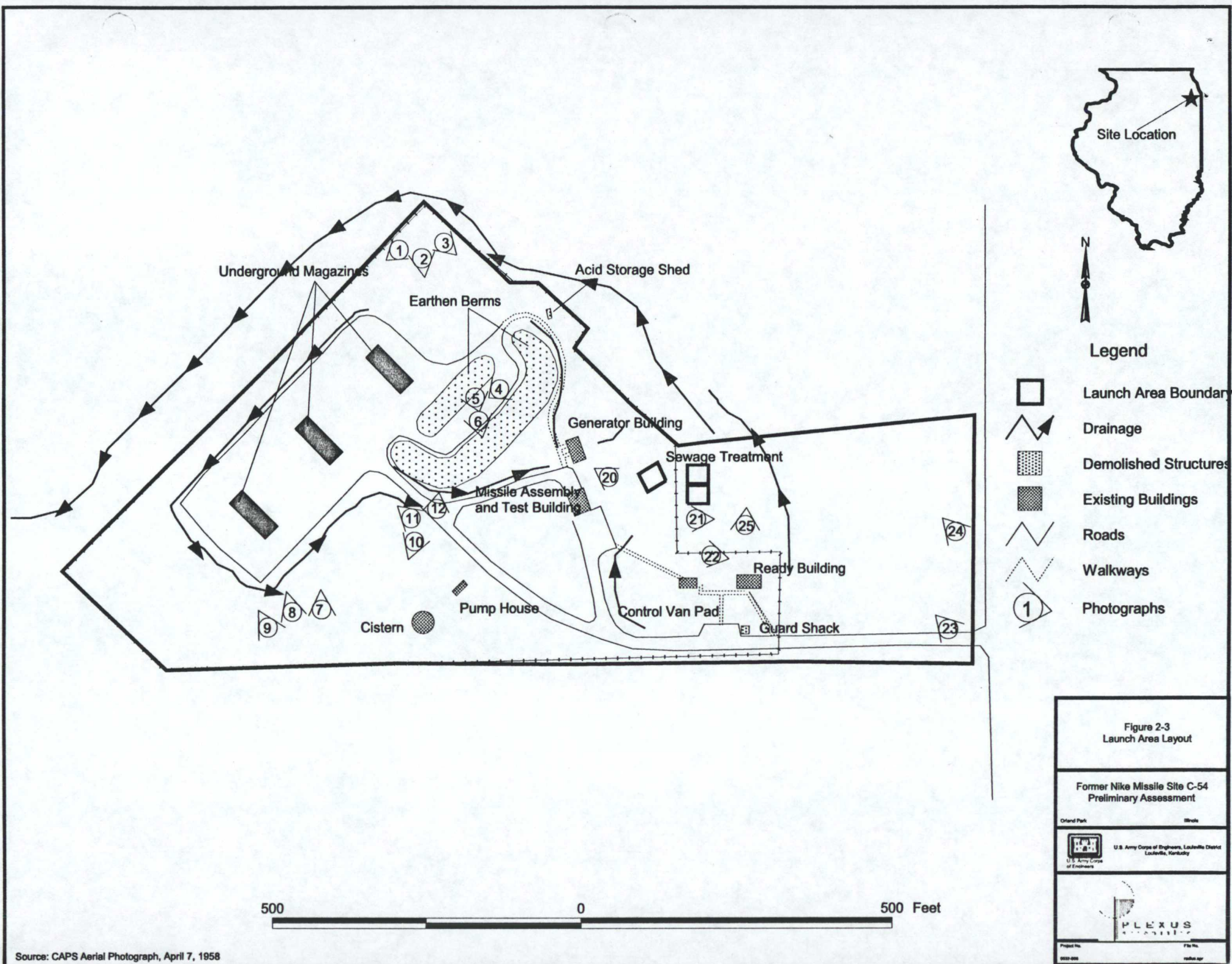


Figure 2-3
Launch Area Layout

Former Nike Missile Site C-54
Preliminary Assessment

Orland Park

Shirley



U.S. Army Corps of Engineers, Louisville District
Louisville, Kentucky

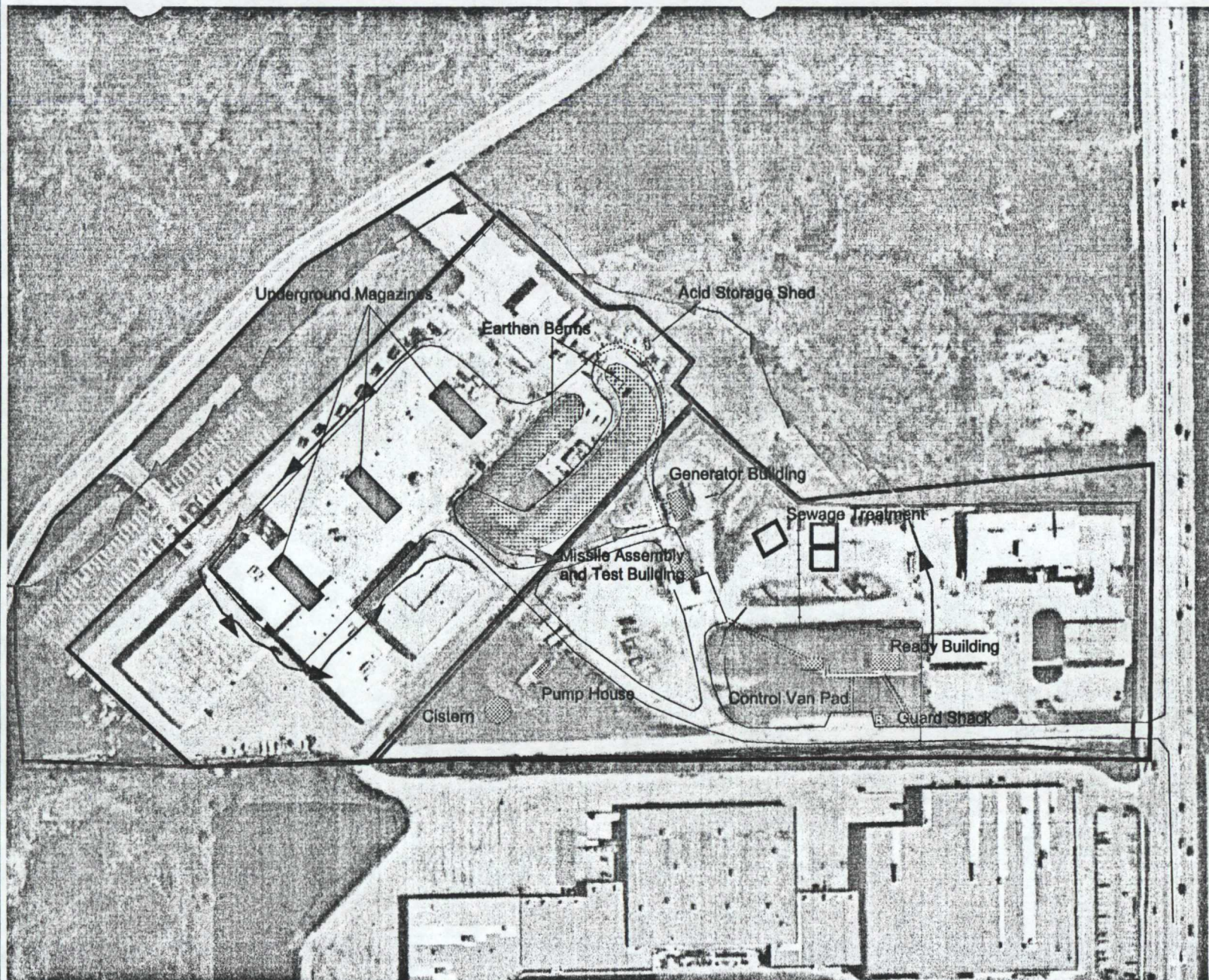


Project No.

File No.

2000-000

2000-000



Legend








-  Launch Area Boundary
-  Drainage
-  Demolished Structures
-  Existing Buildings
-  Roads
-  Walkways

Figure 2-4
Launch Area Overlay

Former Nike Missile Site C-54
Preliminary Assessment

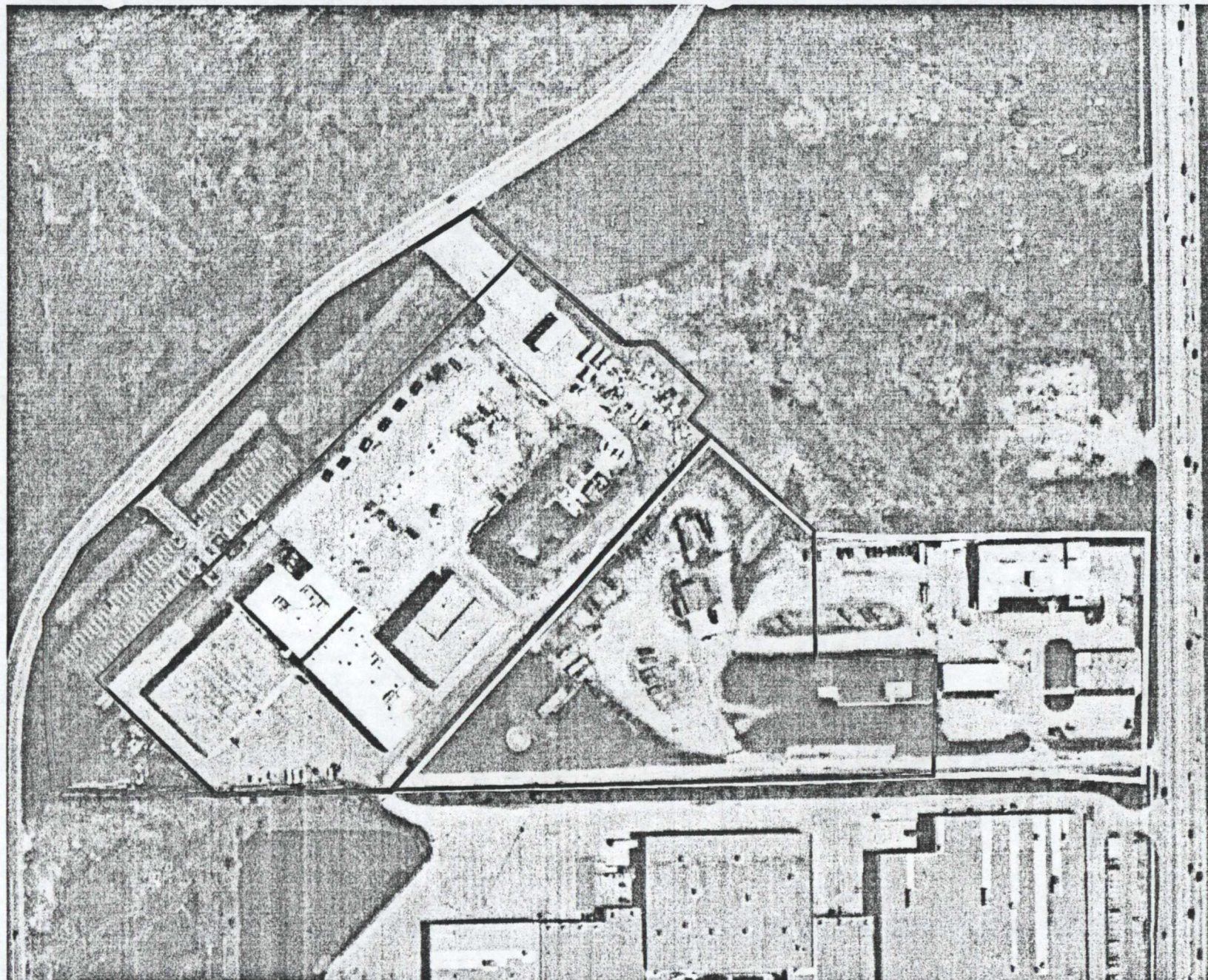
Orland Park Illinois
 U.S. Army Corps of Engineers, Louisville District
 Louisville, Kentucky


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

-  Fenceline of Nike Site
-  Boundary of U.S. Army Reserve Facility
-  Boundary of DPW Facility

Figure 2-5
Launch Area
Property Boundaries

Former Nike Missile Site C-54
Preliminary Assessment

Oxford Park

Illinois



U.S. Army Corps of Engineers, Louisville District
Louisville, Kentucky

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Project No.

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Source: CAPS Aerial Photograph, April 7, 1958; CAPS Aerial Photograph, April 24, 1999

300 0 300 600 Feet

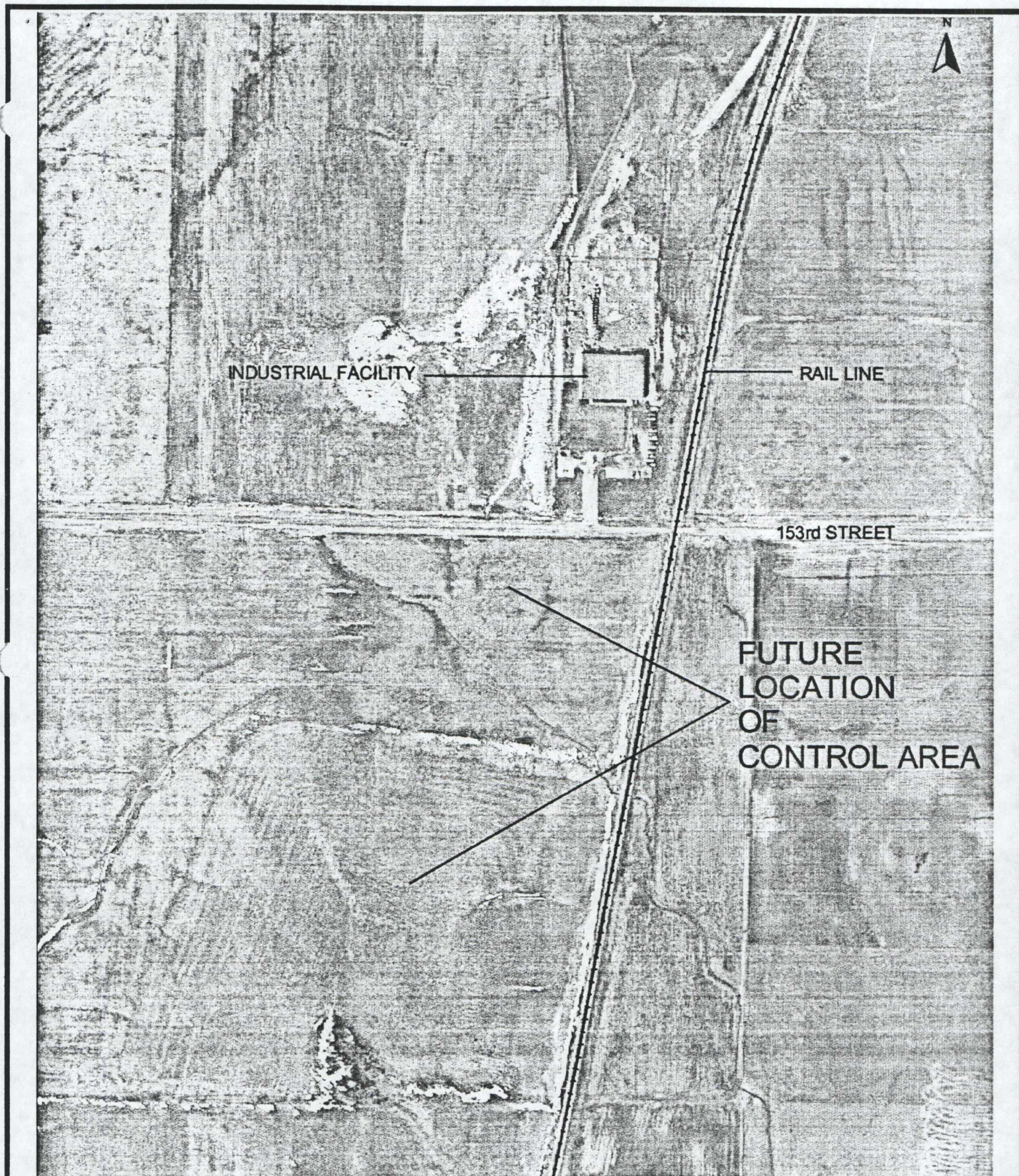


Figure 2-6
Annotated Aerial Photograph
Control Area, April 12, 1955

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



U.S. Army Corps of Engineers, Louisville District
Louisville, Kentucky

Project No.
0032-006

File No.
appendix c.apr



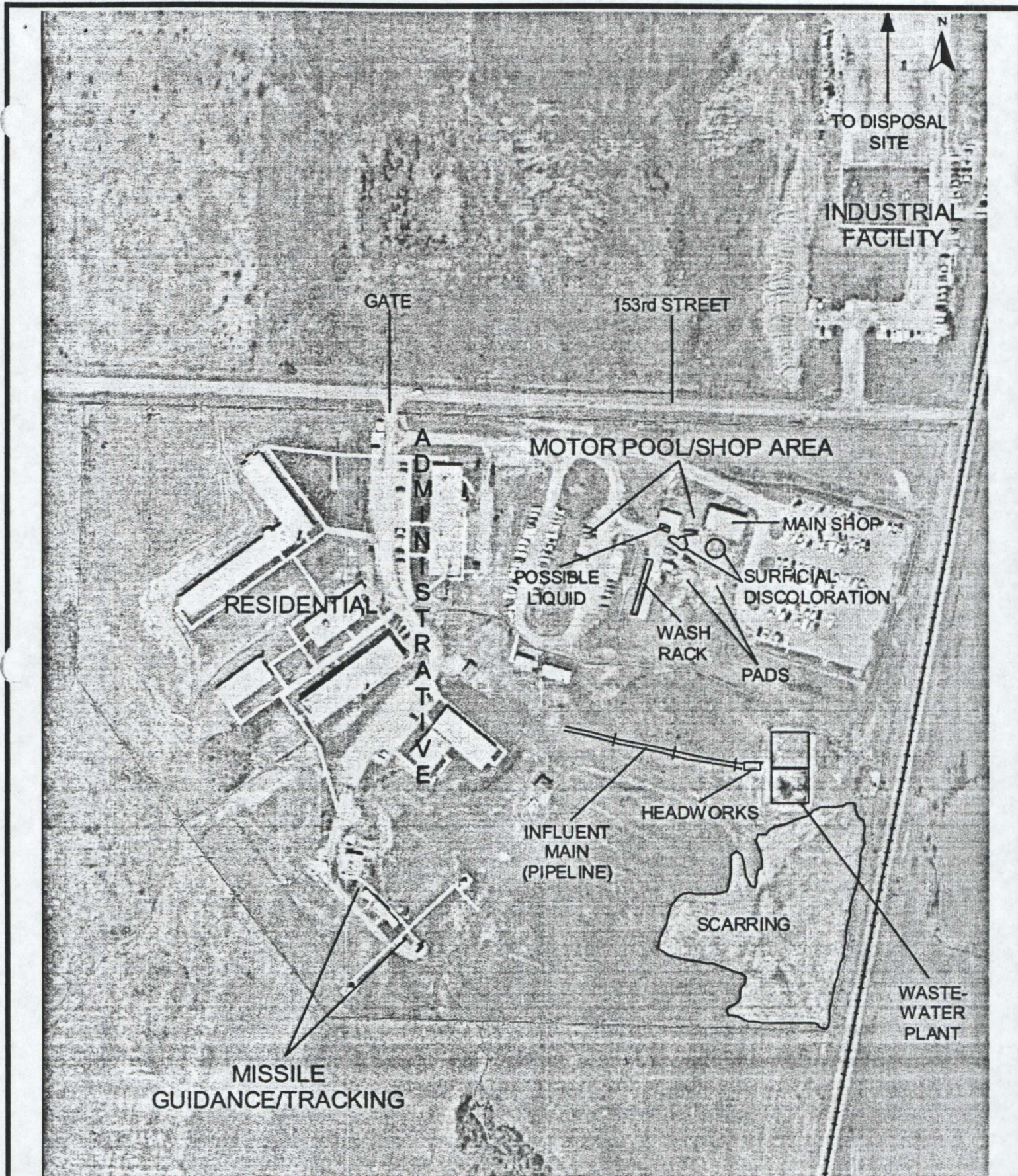


Figure 2-7
Annotated Aerial Photograph
Control Area, April 7, 1958

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



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Louisville, Kentucky

Project No.

0032-006

File No.

appendix c.apr



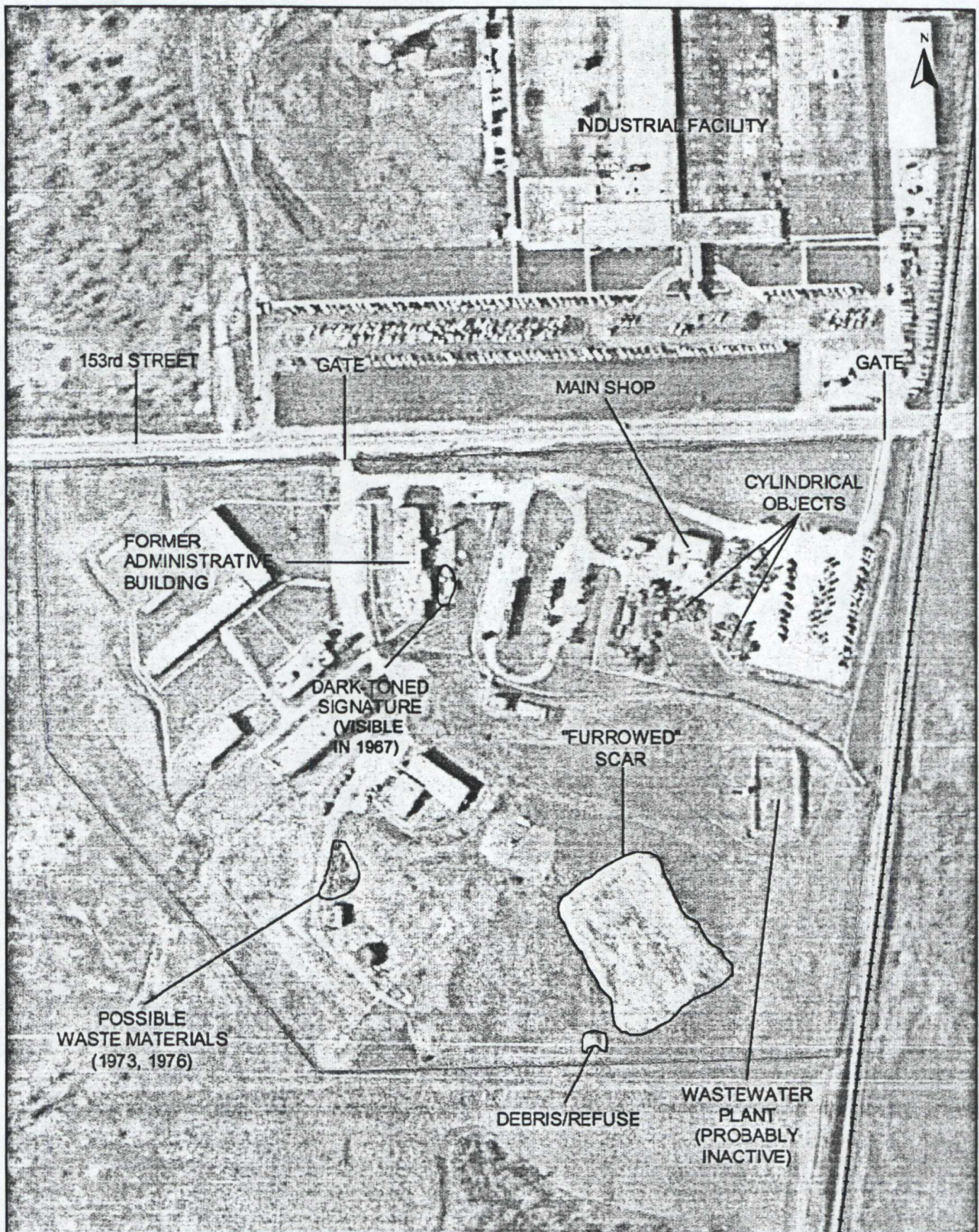


Figure 2-8
Annotated Aerial Photograph
Control Area, March 27, 1973
Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



U.S. Army Corps of Engineers, Louisville District
Louisville, Kentucky

Project No.
0032-006

File No.
appendix c.apr



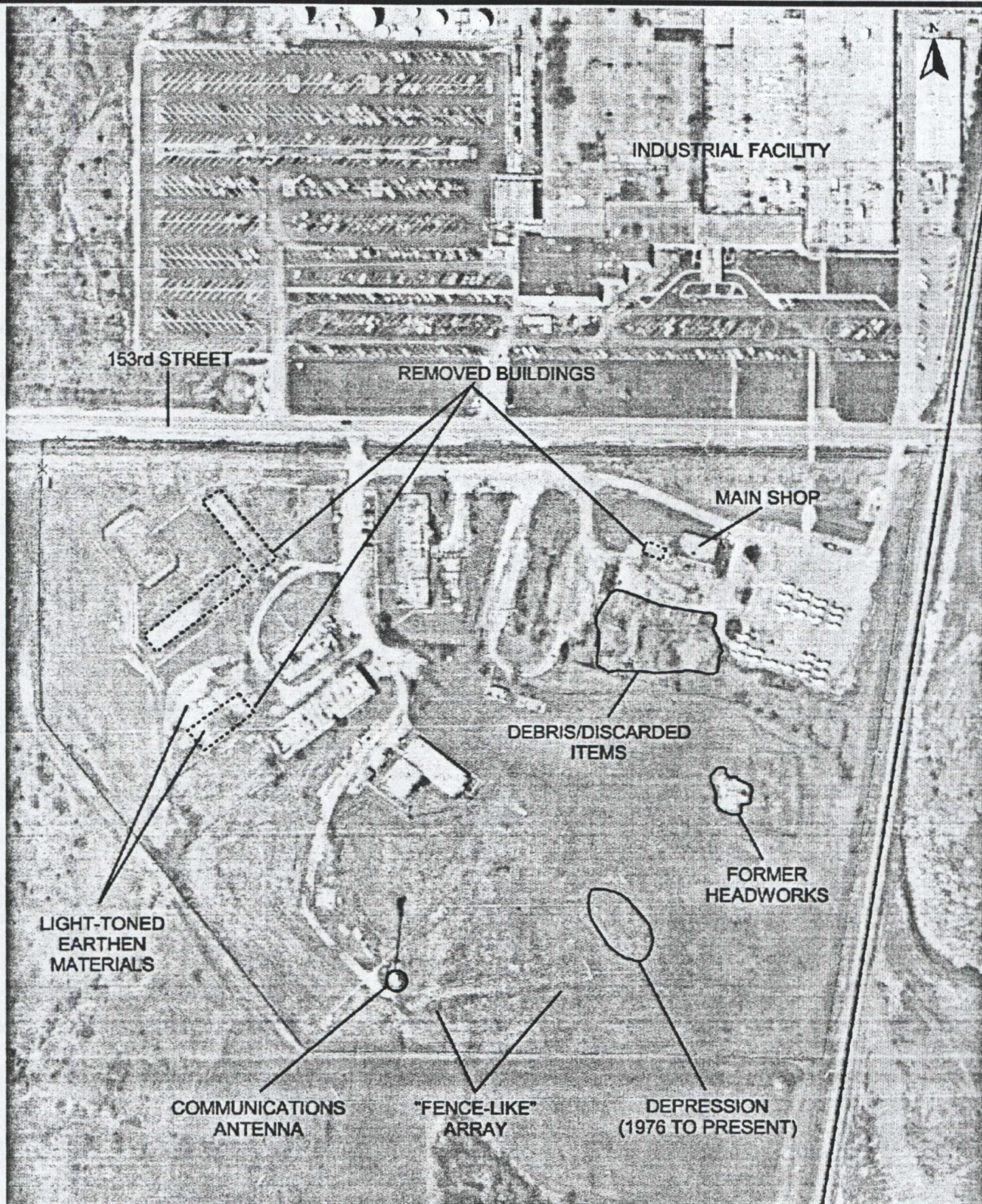


Figure 2-9
Annotated Aerial Photograph
Control Area, April 16, 1985

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



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0032-006

File No.
appendix c.apr



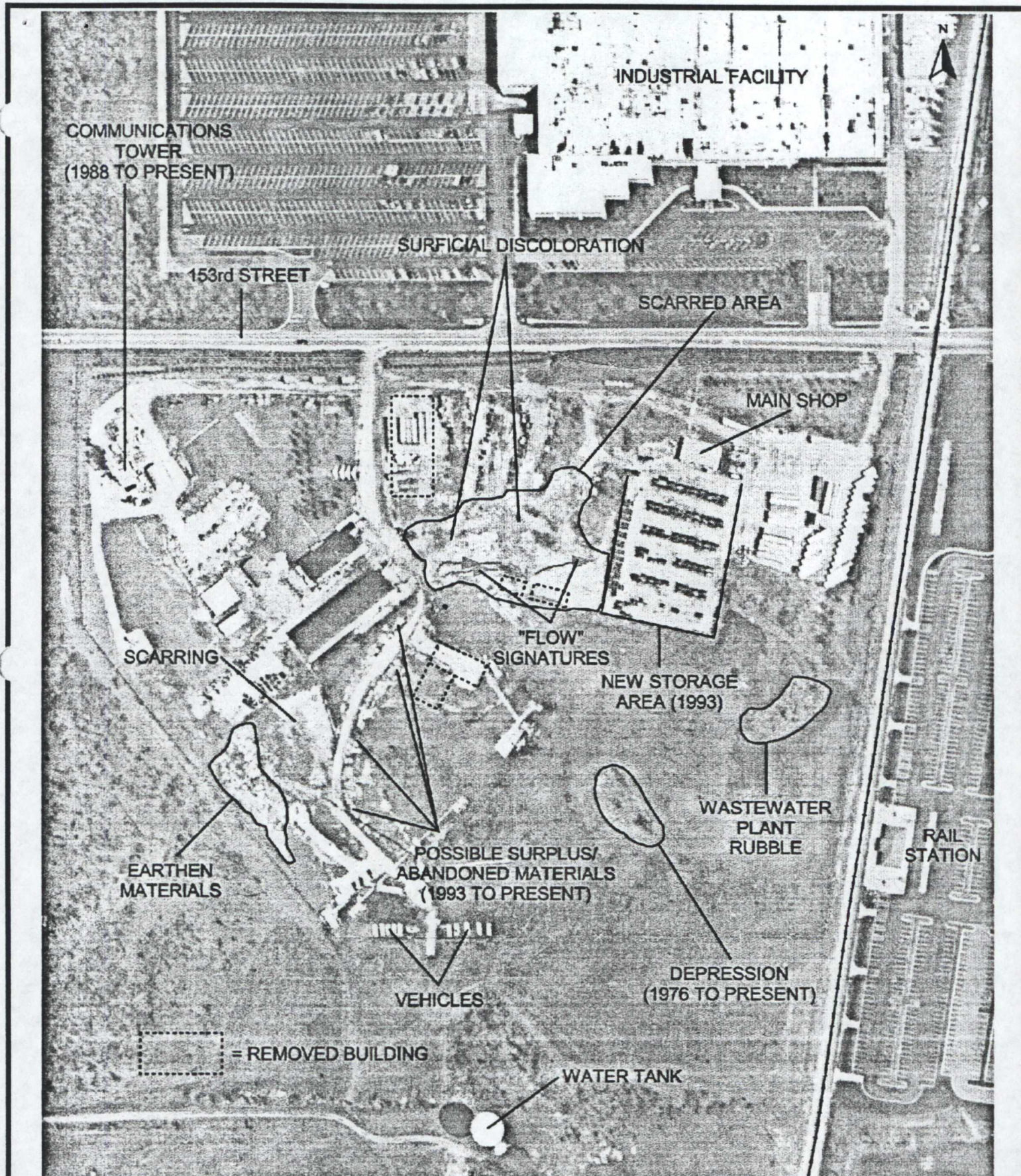


Figure 2-10
Annotated Aerial Photograph
Control Area, April 24, 1999

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



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Project No.
0032-006

File No.
appendix c.apr



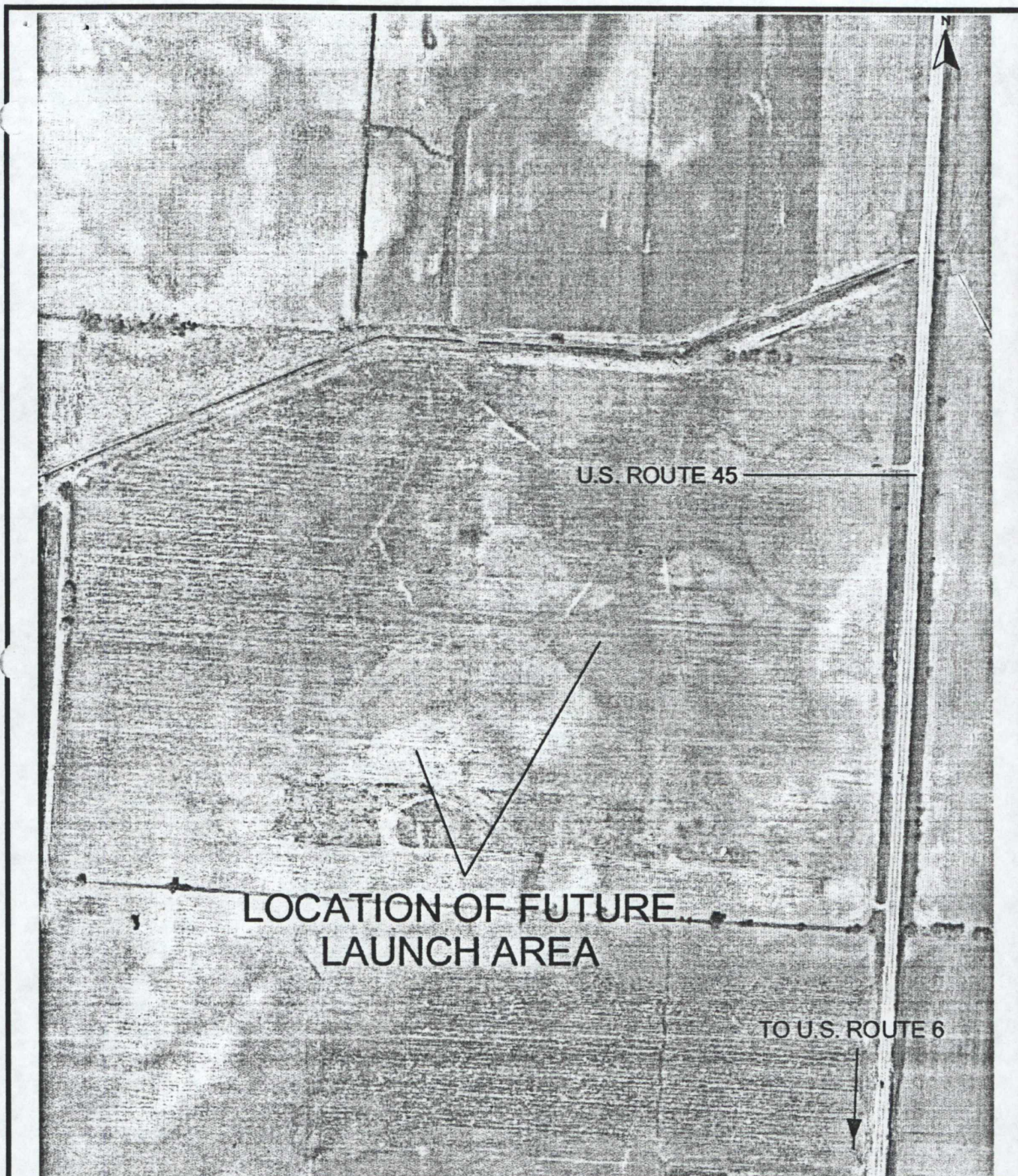


Figure 2-11
Annotated Aerial Photograph
Launch Area, April 21, 1955

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



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Figure 2-12
Annotated Aerial Photograph
Launch Area, April 7, 1958

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



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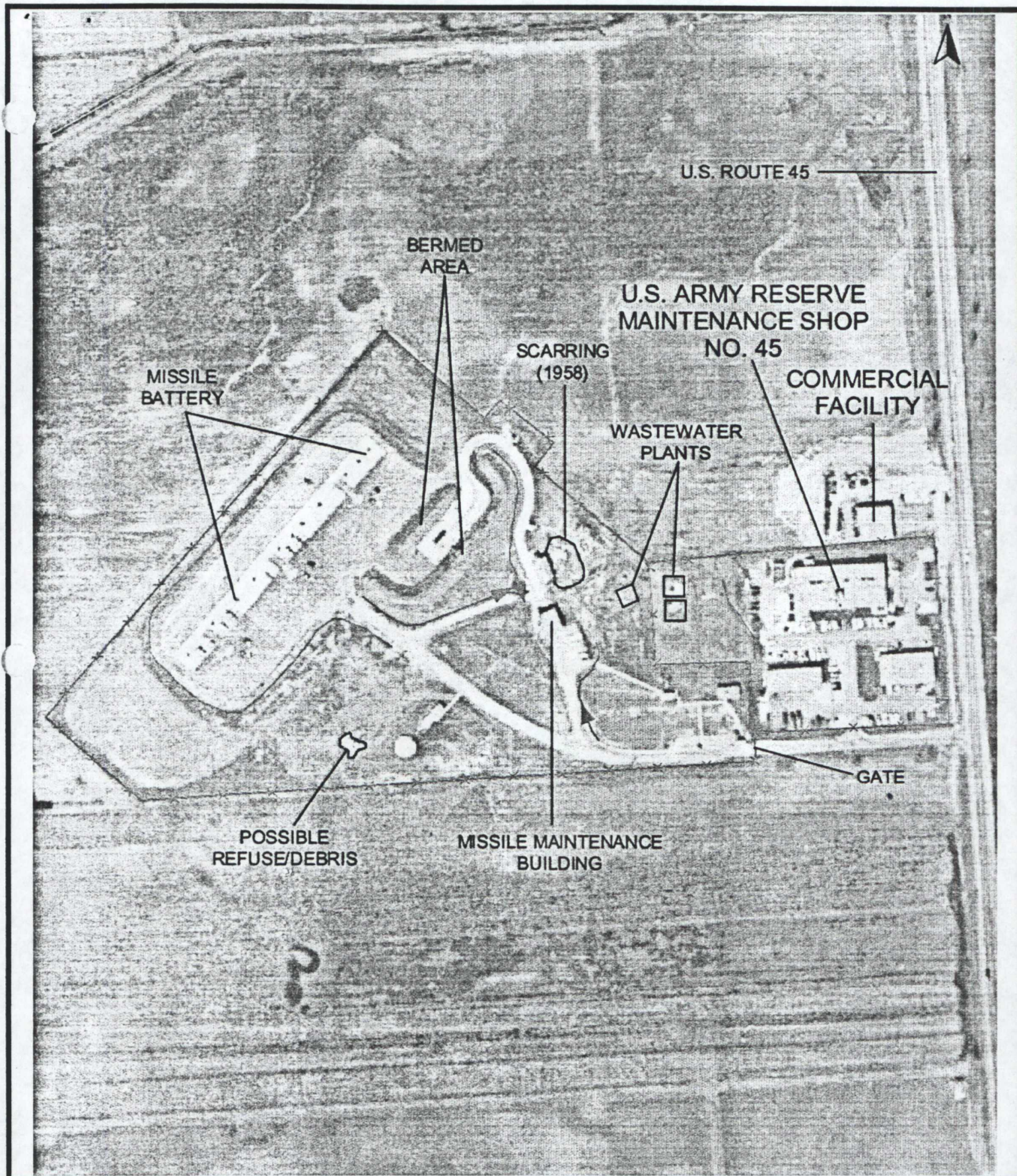


Figure 2-13
Annotated Aerial Photograph
Launch Area, April 20, 1962

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



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File No.
appendix c.apr



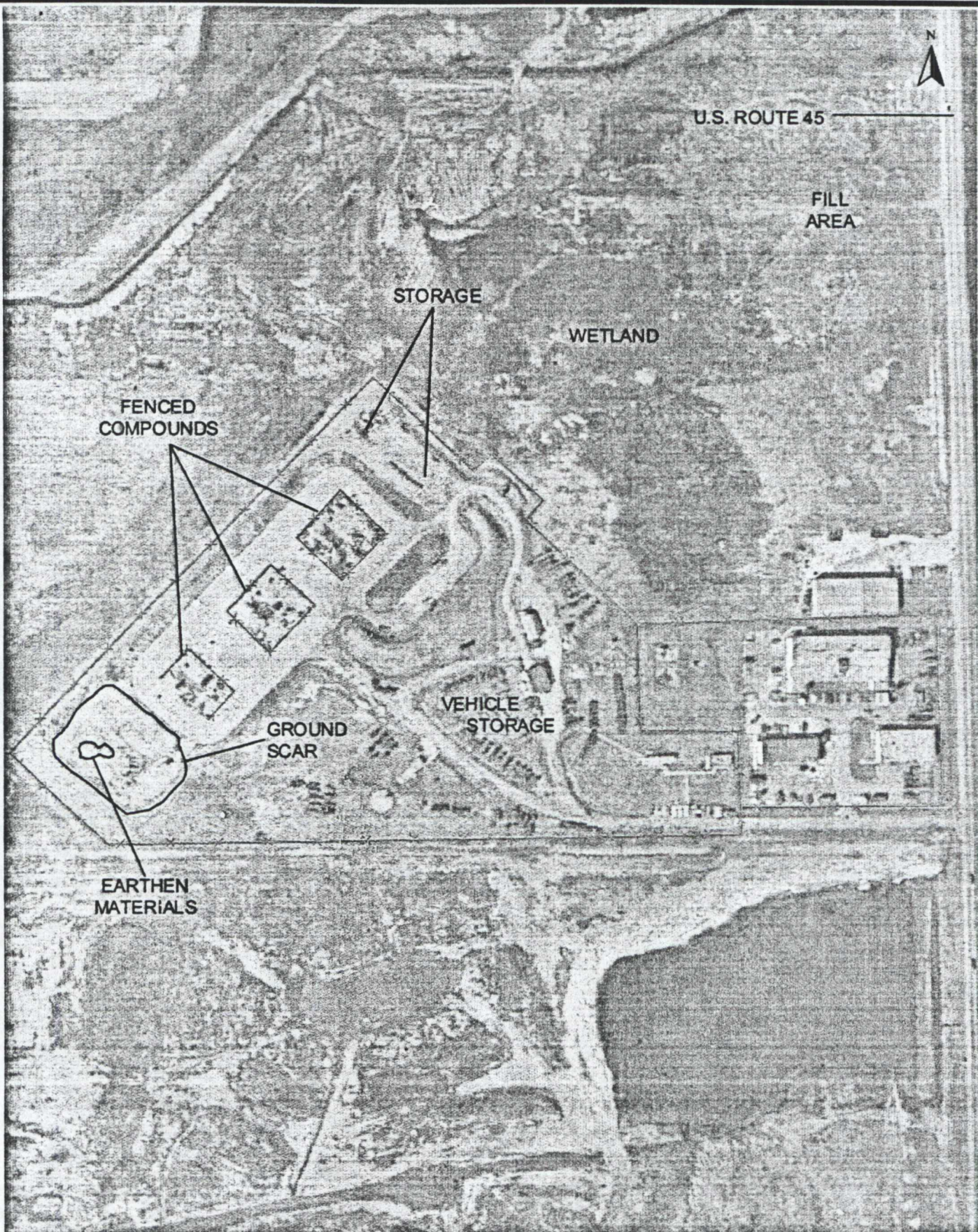


Figure 2-14
Annotated Aerial Photograph
Launch Area, March 22, 1976
Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



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Project No.
0032-006

File No.
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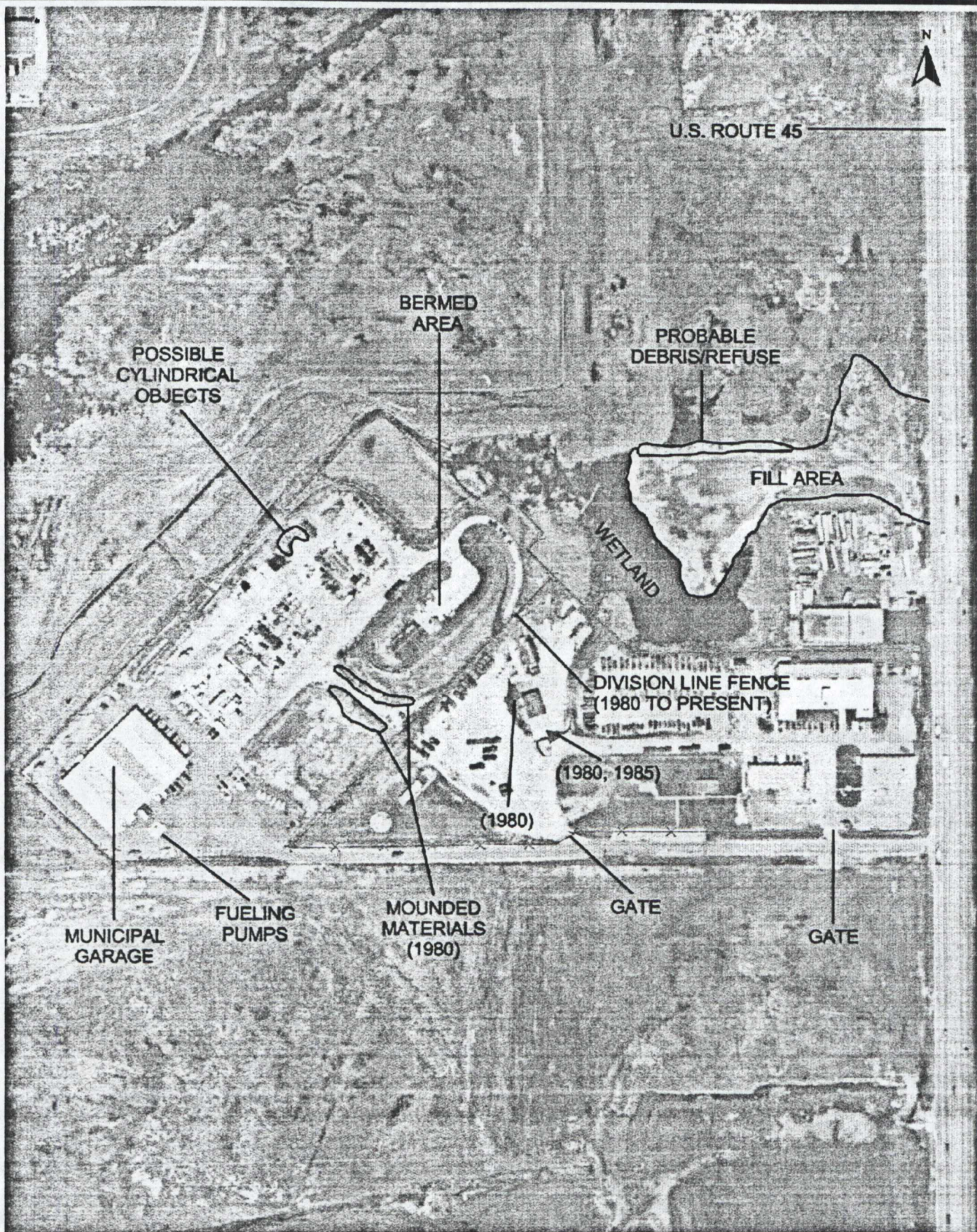


Figure 2-15
Annotated Aerial Photograph
Launch Area, April 16, 1985

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



U.S. Army Corps of Engineers, Louisville District
Louisville, Kentucky

Project No.

0032-006

File No.

appendix c.apr



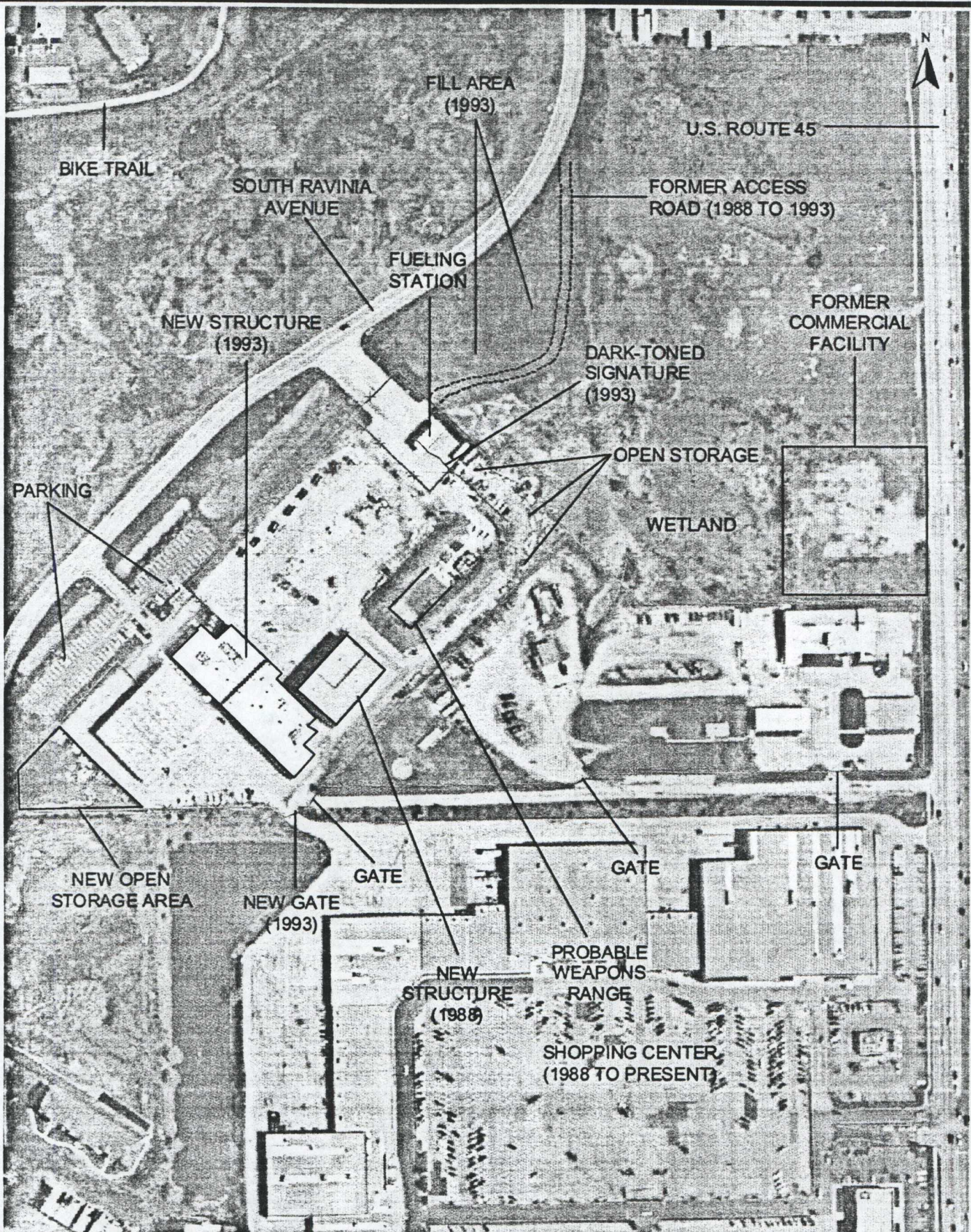


Figure 2-16
Annotated Aerial Photograph
Launch Area, April 24, 1999

Former Nike Missile Site C-54
Preliminary Assessment
Orland Park, Illinois



U.S. Army Corps of Engineers, Louisville District
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Project No.

0032-006

File No.

appendix c.apr

3. GROUNDWATER PATHWAY

3.1 Hydrogeologic Setting

The geology of Cook County and northeastern Illinois is characterized by a relatively thick sequence of unconsolidated Pleistocene glacial deposits discontinuously overlying Silurian dolomite (Willman et al., 1975). Glacial material in the area consists of till in the form of ground and end moraines deposited during the Woodfordian Substage of the Wisconsin Stage glaciation. The till is heterogeneous and consists of silt, clay, sand, and gravel. Pleistocene glacial deposits in Cook County range from 50 to 400 feet in thickness. Residential well logs indicated that bedrock is approximately 110 to 115 feet below the ground surface (bgs).

The underlying bedrock consists of the Silurian aged Niagaran Series Dolomites that have a regional dip of 10 feet per mile toward the southeast (Suter et al., 1959). There are outcrops of the Niagaran Series in many areas of Cook County. The Niagaran Series ranges from a relatively pure dolomite to a cherty, generally silty, dolomite (Willman et al., 1975).

The northeastern region of Illinois relies on four main aquifer systems as a supply of industrial, residential, and municipal water. These aquifer systems include: 1) the sand and gravel deposits of the Pleistocene glacial drift; 2) the Silurian age dolomite formations; 3) the Cambrian-Ordovician aquifer consisting of sandstone from the Ironton-Galesville and the Glenwood-St. Peter Sandstone; and 4) the Mt. Simon Aquifer, consisting of the lower Eau Claire Formations Sandstones (Suter et al, 1959).

Shallow wells of the region tap into groundwater found in the sands and gravels of the glacial deposits that tend to be discontinuous and not widespread. The glacial deposits and the underlying shallow Silurian dolomite aquifers are connected hydrologically. The glacial and Silurian aquifers are separated over most of the region from the Cambrian Ordovician aquifers by the, relatively impermeable, Maquoketa Formation consisting mainly of shale. Wells designed to tap the sandstone aquifers of the Cambrian-Ordovician and the Mount Simon aquifers are typically 800-1500 feet deep (Visocky, 1985).

Shallow groundwater sampling conducted in 1991 at the Launch Area found arsenic, cadmium, chromium and lead at levels above the MCLs. The groundwater samples were unfiltered. The source of these metals was not determined (IT, 1991).

The mean annual precipitation at the site area is approximately 37.38 inches. The 1-year, 24-hour maximum rainfall is 4.16 inches (Illinois State Water Survey, 2001).

3.2 Groundwater Targets

The majority of the population within a 4-mile radius of the Launch and Control Areas relies on municipal water provided by the Village of Orland Park. The system obtains its water from Lake Michigan. There are no municipal groundwater sources within a 4-mile radius of the site. There are 62 wells within 1 mile of the Control Area. The nearest well to the Control Area is located approximately 200 feet north and is operated by Andrew Corporation. Three wells are located on Andrew Corporation property and serve a population of approximately 700 people (ISGS, 1995; USEPA, 2002). Based on the county population there are approximately 860 groundwater

users within 1 mile of the Control Area (USEPA, 2000). There are 16 wells within 1 mile of the Launch Area. The nearest well to the Launch Area is located 400 feet to the south (ISGS, 1995). It is not known if this well is currently in use. Based upon the county population, there are approximately 44 groundwater users within 1 mile of the Launch Area (USEPA, 2000).

3.3 Groundwater Conclusions

There are no municipal groundwater sources located within a 4-mile radius of the site. Several private wells exist within 1 mile of the site. The nearest known well is located approximately 450 feet south of the Launch Area and another well is located approximately 400 feet north of the Control Area. Limited groundwater sampling at the Launch Area found levels of arsenic, cadmium, chromium and lead at levels above the MCLs. The source of these metals was not determined. There is no evidence to indicate that hazardous materials were disposed of onsite, but hazardous chemicals were used at former Nike Sites and were likely used at C-54. The potential for a release of solvents or petroleum hydrocarbons to shallow groundwater exists. Figure 5-1 provides a conceptual model of potential pathways for contaminant migration.

4. Surface Water Pathway

4.1 Hydrologic Setting

Surface water runoff from the Control Area drains to the east side of the site and enters an unnamed creek. The creek travels for 2,500 feet where it enters an unnamed pond. There is no surface discharge from the pond. In addition, surface water runoff also drains from the west side of the site and intercepts no water bodies. This is the end of the 15-stream mile pathway (USGS, 1993a, 1993d). Most of the Control Area lies outside of the 100-year floodplain with the exception of 0.45 acres in the northwest corner that are within the 100-year floodplain (FEMA, 1996) (Figure 4-1).

Surface water from the Launch Area would either infiltrate or flow to the wetlands located on the north side of the site. There is no surface discharge from the wetland. This is the end of the 15-stream mile pathway (USGS, 1993a, 1993d). Most of the Launch Area lies outside of the 100-year floodplain with the exception of 0.61 acres in the eastern portion that are within the 100-year floodplain (FEMA, 1996) (Figure 4-2).

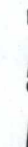
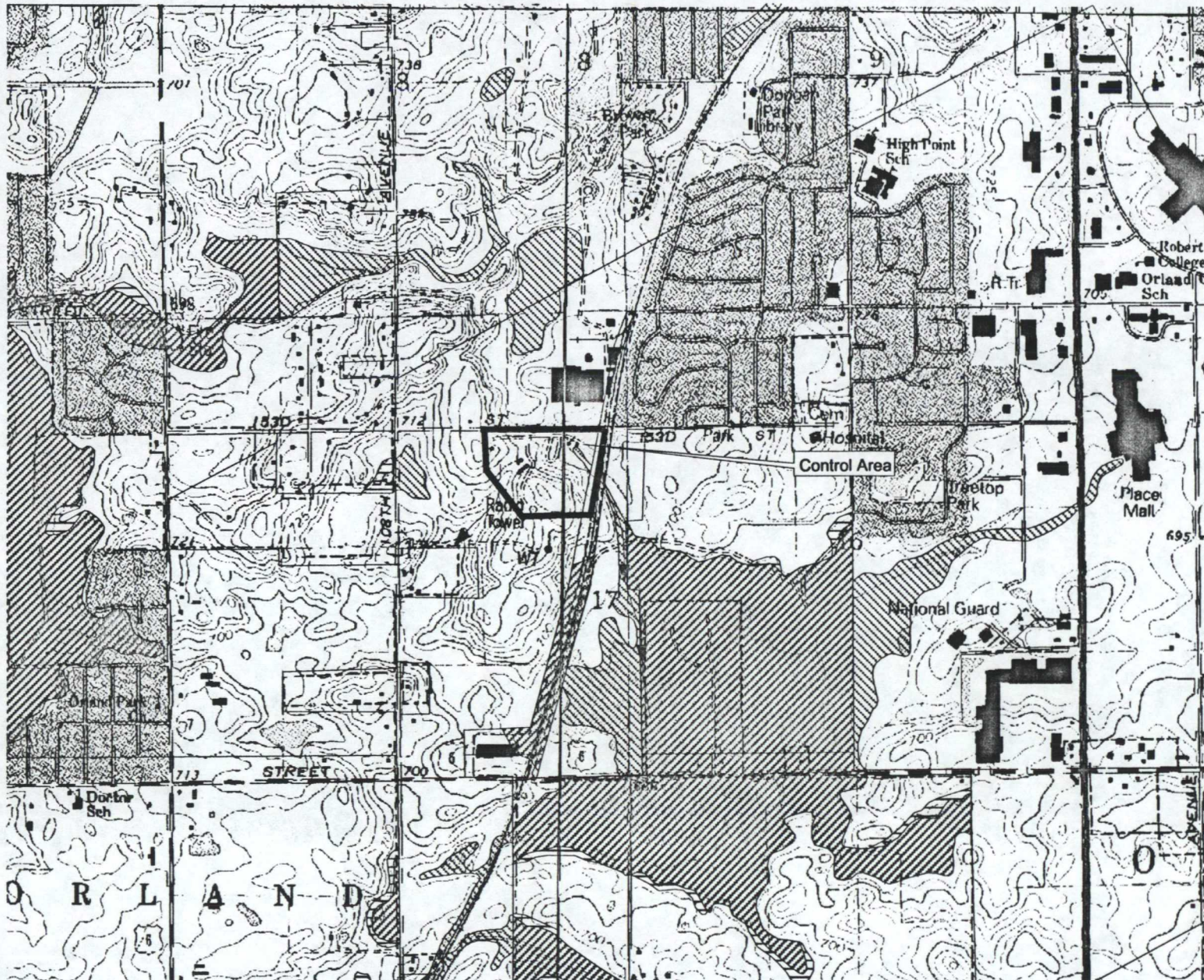
Surface water sampling conducted at the Launch Area during the 1991 Contamination Evaluation indicated trace amounts of TPH in one sample. Results from that investigation could not be conclusively linked to past Nike site activities due to current uses of the property (IT, 1991). There has been no surface water sampling associated with the Control Area.

4.2 Surface Water Targets

As stated previously, the population within a 4-mile radius relies mainly on municipal water provided by the Village of Orland Park, which obtains its water from Lake Michigan. The intake is not along the 15-mile surface water pathway (USGS, 1993a, 1993d). Other than the wetland area there are no other sensitive environments along the 15-stream mile pathway. There are no fisheries along the 15-stream mile pathway.

4.3 Surface Water Conclusions

Based upon the aerial analysis a release of contaminants to surface water may have occurred in the past at both the Launch and Control Areas. No ongoing releases of contamination exist. Surface water is not used for potable purposes along the surface water migration pathway. Figure 5-1 provides a conceptual model of potential pathways for contaminant migration.



Legend

Surface Water Pathway

Floodzones

Inundated by 100-yr flood, no BFEs* determined

Inundated by 100-yr flood, BFEs determined

Determined to be outside the 100-yr and 500-yr floodplains

Inundated by 500-yr flood, inundated by 100-yr flood w/ average depths of < 1 ft or w/ drainage areas < 1 sq mi; or an area protected by levees from 100-yr flood.

BFE - Base flood elevation

Reference: USGS 7.5 Minute Quadrangles (Mokena, 1993, Palos Park, 1993, Sag Bridge, 1993; Tinley Park, 1993).
FEMA Q3 Flood Map, Cook County, 1996.

0.5 0 0.5 1 Miles

Figure 4-1
15 Stream Mile Pathway
Control Area

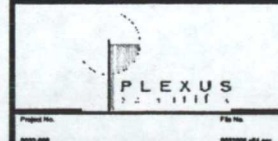
Former Nike Missile Site C-54
Preliminary Assessment

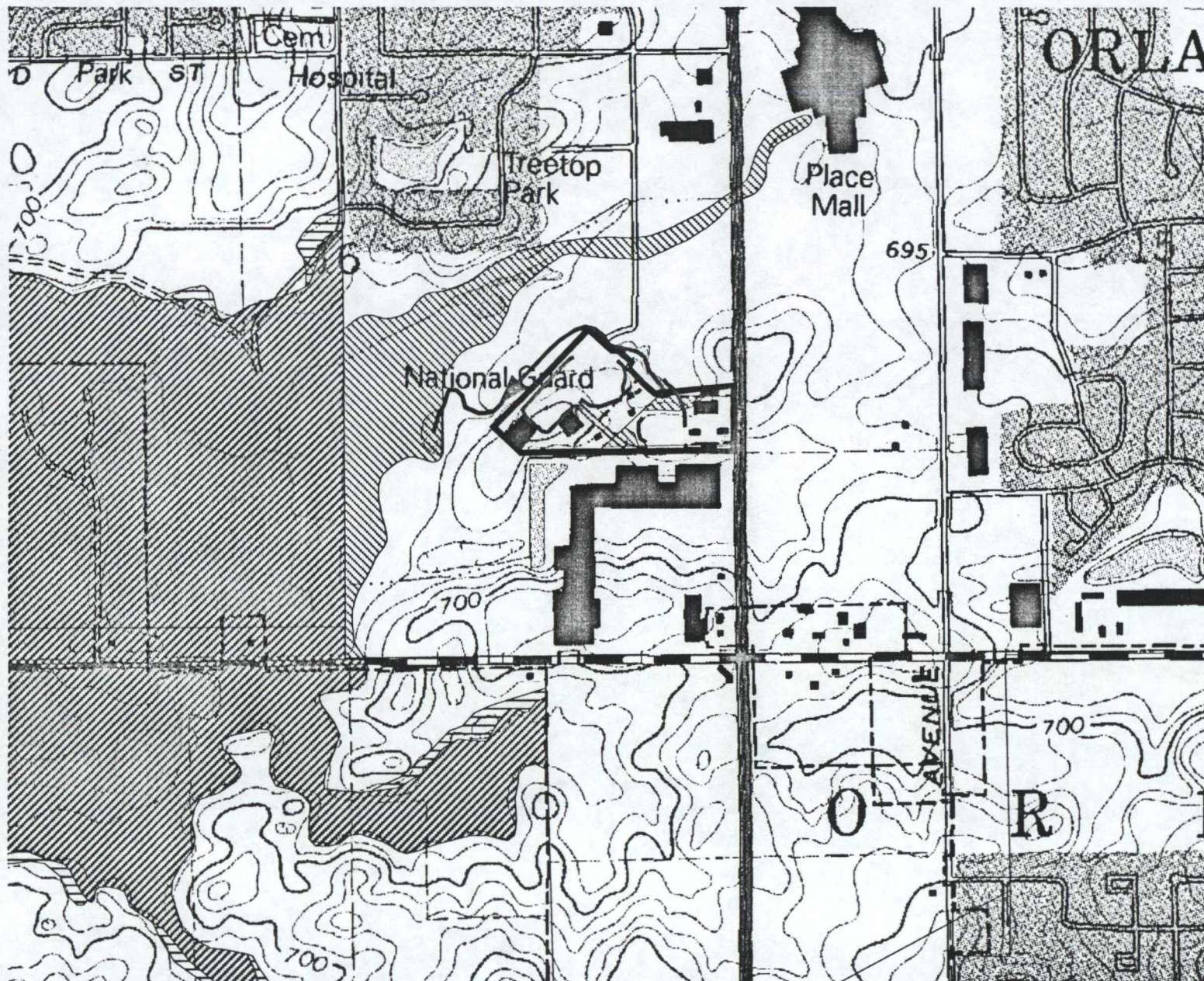
Orland Park

Wheeler

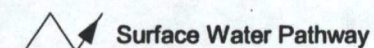


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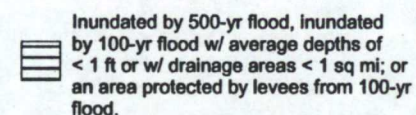
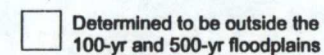
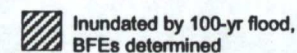
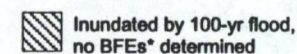




Legend



Floodzones



BFE - Base flood elevation

Reference: USGS 7.5 Minute Quadrangles (Mokena, 1993, Palos Park, 1993, Sag Bridge, 1993; Tinley Park, 1993).
FEMA Q3 Flood Map, Cook County, 1996.

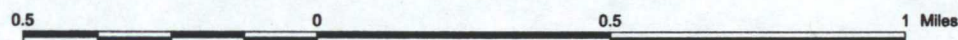


Figure 4-2
15 Stream Mile Pathway
Launch Area

Former Nike Missile Site C-54
Preliminary Assessment

Orland Park

Wilde



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Louisville, Kentucky

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Project No.
9502-002

File No.
9502002-001.dwg

5. SOIL EXPOSURE AND AIR PATHWAYS

5.1 Physical Conditions

The Control Area is located on the property of Andrew Corporation. Three of the former Control Area buildings remain. The current owner has added additional buildings. Unpaved areas are well vegetated with grass. Andrew Corporation currently uses the site for tractor-trailer parking. A locked gate restricts public access to the site. No blowing dust, odors, stressed vegetation, debris or exposed waste was noted during the July 2001 site reconnaissance (Plexus, 2001).

Unpaved areas of the Launch Area are also well vegetated and the four remaining buildings are maintained and used by the U.S. Army Reserve maintenance facility. Fences around the properties limit the site access for both the Army Reserve facility and the Village of Orland Park. No blowing dust, odors, stressed vegetation, debris or exposed waste was noted during the July 2001 site reconnaissance (Plexus, 2001).

5.2 Soil and Air Targets

Andrew Corporation uses the Control Area for tractor-trailer parking and equipment storage. The Launch Area is an Army Reserve vehicle maintenance facility and the Village of Orland Park DPW facility (Plexus, 2001). There are no students or daycare facilities within 200 feet of either the Control or Launch Area.

The total population within a 4-mile radius of the Control Area is 63,440 people (Plate 1). The nearest residence is northeast of the Control Area within 400 feet of the site (USGS, 1993d; Plexus, 2001). Population within 0.25 mile is approximately 223; between 0.25 and 0.5 mile 814; between 0.5 and 1 mile is 1,196; between 1 and 2 miles is 15,101; between 2 and 3 miles is 16,556; and between 3 and 4 miles is 29,550 (USEPA, 2000).

The total population within a 4-mile radius of the Launch Area is 68,787 people (Plate 1). The nearest residence is southwest of the Launch Area within 300 feet of the site (USGS, 1993d; Plexus, 2001). Population within 0.25 mile is approximately 135; between 0.25 and 0.5 mile is 721; between 0.5 and 1 mile is 3,216; between 1 and 2 miles is 17,098; between 2 and 3 miles is 30,024; and between 3 and 4 miles is 17,593 (USEPA, 2000).

There are approximately 1,634 acres of scattered wetlands within a 4-mile radius of the Control Area (Plate 1). The nearest wetland is about 2 acres and lies approximately 600 feet north of the Control Area. The distribution of wetlands is approximately as follows: 86 acres between 0.5 and 1 mile; 415 acres between 1 and 2 miles; 504 acres between 2 and 3 miles; and 609 acres between 3 and 4 miles (USFWS, 1981a, b, c, d).

There are approximately 1,662 acres of scattered wetlands within a 4-mile radius of the Launch Area (Plate 1). The nearest wetland is about 25 acres, which borders the Launch Area to the west and north. The distribution of wetlands is approximately as follows: 67 acres between 1/2 and 1 mile; 248 acres between 1 and 2 miles; 564 acres between 2 and 3 miles; and 730 acres between 3 and 4 miles (USFWS, 1981a, b, c, d).

The Launch and Control Areas lie within the range of the Prairie Bush Clover (*Lespedeza leptostachya*), the Eastern Prairie Fringed Orchid (*Plantanthera leucophaea*) and the Hines Emerald Dragonfly (*Somatochlora hineana*). The Prairie Bush Clover and Eastern Prairie Fringed Orchid are federally listed threatened species. The Hines Emerald Dragonfly is a candidate species currently in the listing process. The U.S. Fish and Wildlife Service did not identify any of these species as being present on the sites; only that the sites lie within the range of the species. Guidelines were provided for protection of the species during construction activities (Nelson, 2001).

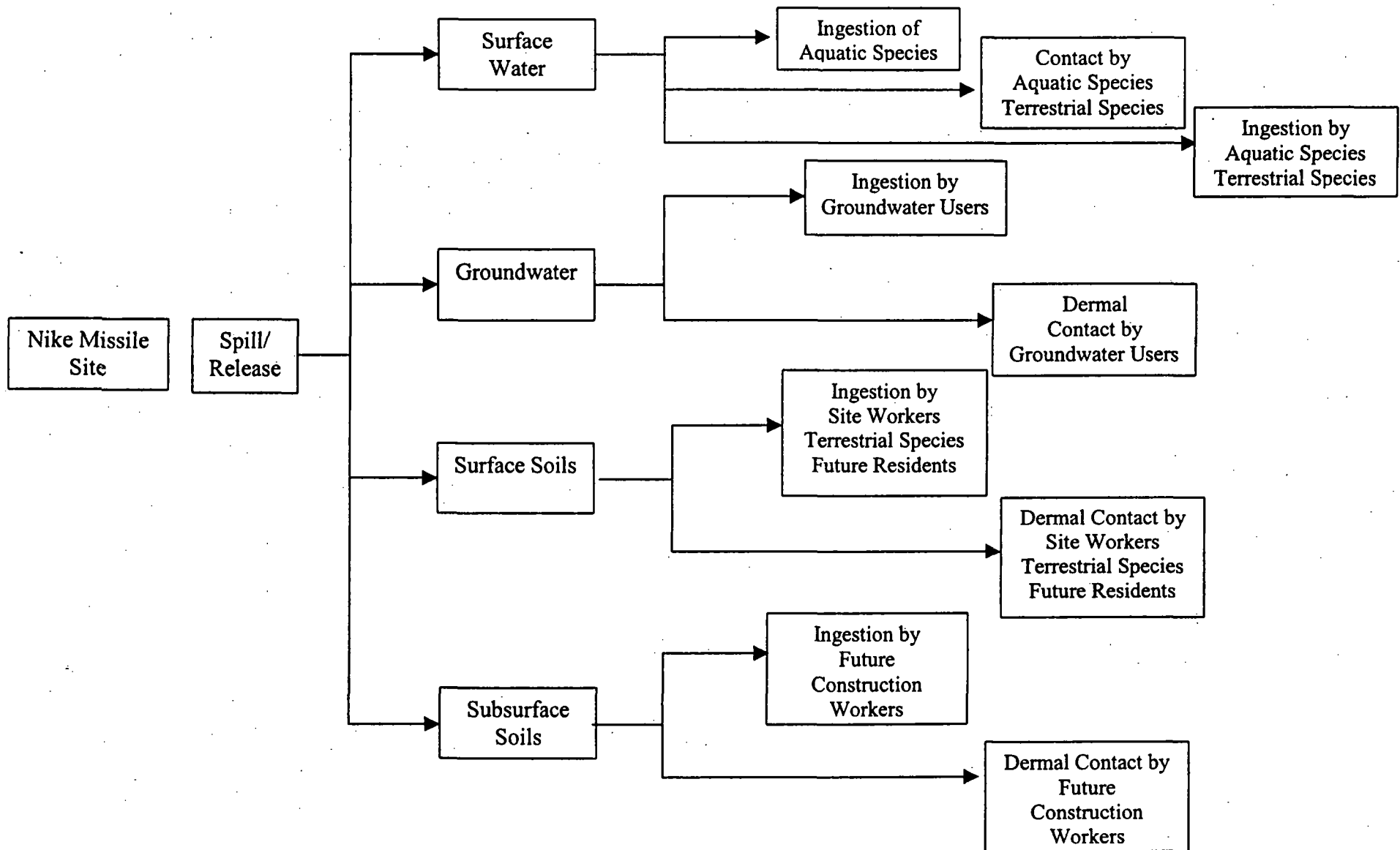
Former Nike Battery C-54 lies within the range of the following Illinois special status species:

Common Name	Species	Species Status
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Endangered
Common Moorhen	<i>Gallinula chloropus</i>	Threatened
King Rail	<i>Rallus elegans</i>	Endangered
Pied-bill Grebe	<i>Podilymbus podiceps</i>	Threatened
Red shouldered hawk	<i>Buteo lineatus</i>	Threatened
Sandhill Crane	<i>Grus canadensis</i>	Threatened
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	Endangered

5.3 Soil Exposure and Air Pathway Conclusions

The soil exposure pathway appears to pose a minimal threat at the Former Nike C-54 Launch and Control Areas. As there is no evidence that any waste was deposited at the surface in the past, or is exposed at the surface currently, a release to the air is not suspected. In addition, no odors were detected, there was no indication of any blowing dust or soil during the site reconnaissance, and the areas appear to be regularly maintained. Figure 5-1 provides a conceptual model of potential pathways for contaminant migration.

Figure 5-1: Conceptual Site Model



6. SUMMARY AND CONCLUSIONS

The U.S. Army from 1958 through 1961 operated former Nike Site C-54. After deactivation, the lease at the Control Area was terminated, a portion of the Launch Area was sold to the Village of Orland Park and the remainder was retained by the U.S. Army for use as an Army Reserve facility. The C-54 Launch Area had three underground missile magazines. The site was equipped with 30 Ajax Missiles and 12 Ajax type launchers. Ajax Missiles had a solid fueled booster, a liquid fueled sustainer motor, and high-explosive warheads. Other buildings at the Launch Area included a support building, a missile maintenance building, a generator building, and a missile fueling building.

The Control Area is located on the property of Andrew Corporation. Three of the former Control Area buildings remain. The floor drain located in the motor pool has been capped. The sewage treatment plant is no longer in use. All of the underground storage tanks (USTs) have been removed and the Control Area well has been capped. Andrew Corporation currently uses the site for tractor-trailer parking and storage.

The Launch Area is located on the property of the Village of Orland Park Public Works Department and the U.S. Army Reserve. The Village of Orland Park's ESDA used one of the underground magazines from 1971 until the mid-1980s. The ESDA facility included a communications center and shelter for 700 to 1000 people. Due to difficulties with maintaining the facility, ESDA discontinued use, equipment was stripped from the facility, and the magazine was filled. The administration building and garages of the Village of Orland Park Department of Public Works were built on top of the structures. Additionally, the area around the administration buildings and garages is paved. The bermed area of the former acid refueling station is currently used as a firing range by the police department. The Army Reserve facility is a vehicle maintenance facility. Four of the former Nike site buildings remain on site. The Army Reserve has added additional structures to the site. One UST has been removed from the site. No records of this removal were located. The former sewage treatment plant at the Launch Area is now a gravel parking lot. The well onsite is used for non-potable water needs.

No documentation was found indicating disposal of hazardous substances at the former Nike C-54. However, studies at other Nike sites have found that activities at Launch Areas can result in environmental contamination from volatile organics, petroleum hydrocarbons, chromium, lead, and asbestos. No site-specific information was located indicating the presence of a seepage system or discharges to surface water.

Analysis of historic aerial photographs was performed as part of the PA. The following observations were made in the aerial analysis:

- Liquid flow "signatures" at both the Control and Launch Areas, which were noted in several years of analysis, may indicate runoff from precipitation or release of liquids.
- Scarring was noted in the 1958, 1973 and 1998/99 aerial analysis of the Control Area. These ground scars were not evident during the site reconnaissance.

If wastes were disposed of onsite, shallow groundwater quality is likely to be affected. However, groundwater use in the area is very limited. Sampling of shallow groundwater at the Launch Area indicates elevated levels of metals in groundwater.

A release to surface water from site activities may have occurred. No current sources are suspected. Surface water is not used for potable purposes along the surface water migration pathway.

Both the Control and Launch Areas are paved and vegetated and no exposed waste or staining was observed during the site reconnaissance, therefore the likelihood of human exposure to contaminated soils is considered minimal. Due to the pavement and vegetation covering most of the site and the lack of any odors or blowing particulates during the site reconnaissance, no release of contaminants to the air is suspected.

Based upon the findings of this PA, the following recommendations should be considered:

- Conduct a Site Inspection at C-54 Control Area. Critical sample locations should include: in the vicinity of the Paint and Oil Shed, Maintenance and Spares Trailer, Generator Building, Motor Pool, Sewage Treatment Plant, and drainage ditches. Specific sample locations, sampling matrix, and analysis will be defined in the SI work plan.
- Conduct a Site Inspection at C-54 Launch Area excluding the portion of the property occupied by the U.S. Army Reserve Area Organization Maintenance Shop No. 45. Critical sample locations should include: in the vicinity of the Acid Fueling Station, the Acid Storage Shed, Underground Storage Magazines, and drainage ditches. Specific sample locations, sampling matrix, and analysis will be defined in the SI work plan.
- Determine if any USTs remain on site and seek closure of the USTs.

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